FOUNDRY TRADE JOURNAL
Established 1902
WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

Vol. 86 Thursday, February 10, 1949 No. 1693

49, Wellington Street, London, W.C.2
'Grams: "Zacatecas, Rand, London"
'Phone: Temple Bar 3951 (Private Branch Exchange)
PUBLISHED WEEKLY: 26s. per annum (Home and Overseas)

The Festival and the Foundry

We are sure that everybody in the foundry industry fervently hopes that the 1951 Festival of Britain will emulate the success achieved by the Great Exhibition of 1851. This forthcoming manifestation is being organised by the Council of Industrial Design and an announcement has already been made that the exhibition on the south side of the Thames is to be selective, and no space is to be sold to individual firms. The theme of the Festival, to quote from a Press release, is "to show Great Britain's contribution to civilisation and culture in the arts, in science and in industry. Except where an historical record is necessary, the intention is to confine the exhibits to contemporary production and contemporary techniques and therefore to the contemporary idiom in design. This decision carries no reflection on those manufacturers whose livelihood is gained by reproducing period or retrospective designs, but it is necessary to emphasise this decision at the earliest stage to avoid later misunderstandings." We are not at all sure what "idiom in design" is meant to imply. In literary matters "idiom" is quite clear; however, we were helped somewhat by hearing an architect refer to the "Doric idiom." Thus we can presume that the phrase means a peculiar and outstanding feature in current productions of industry. Later in this document, there is an added definition which reads: "The precise methods of selection of manufactured goods, in their many categories, have not yet been decided, though the principle of selection can be clearly stated; the highest standard of contemporary design, which must embrace functional, æsthetic and engineering qualities taken together." To carry out this object, the Council of Industrial Design is creating a "Stock List." This is to take the form of a photographic card index of material sent in which approaches the standard set by the organisers. Samples, or the like, of the goods can be kept confidential should the sender so desire.

On receipt of this document, we have been wondering just what the four thousand-odd foundries of this country can contribute. A modish ash tray; an aero engine; a precision casting; streamlined machine tools; push-button controlled moulding machines; cooking or space-heating stoves, may or may not fill the bill, as our readers are invited to submit material illustrating those items "which they consider to be their best work, bearing in mind that best selling lines are not always those which a firm considers its best designs." A preponderating percentage of the foundry industry's manufactures are not finished goods, but components, and there seems to be little provision for these in the general set-up of the Festival.

We have never been convinced that this country was too good at industrial design, but it was, and is, pre-eminent in functional quality. It was design, not inherent value, that sold much foreign produce in British stores in pre-war days. It was functional quality which sold British goods abroad. Maybe we are wrong, but we should like for the 1951 Festival a little more stress on functional excellence, plus exhibition finish, and a little less on industrial design as expressed in the contemporary idiom. It is as well to remember that, whilst the 1851 exhibition brought much business to this country, so did the Paris *"Arts Decoratifs"* of 1925.

Contents

The Festival and the Foundry, 109.—Correspondence, 110.—The Institute of Metals, 110.—Forthcoming Events, 110.—Anniversary Awards, 110.—Steel Foundry Research, 111.—Expenses Allowances, 117.—Foundry Drying Systems, 118.—Recent Development in Cast Iron in the U.S.A., 119.—Notes from the Branches, 119.—Institute Elects New Members, 120.—50th Anniversary of Borax Consolidated, 120.—Manchester Chair of Engineering, 121.—Changes of Name, 121.—The Edwards Cupola Lighter, 121.—Obituary, 121.—New Companies, 122.—Increases of Capital, 122.—Recent Shipbuilding Orders, 122.—News in Brief, 123.—Personal, 124.—New Patents, 125.—Chrome Ore Selling Prices, 126.—Company News, 128.—Raw Material Markets, 130.

Correspondence

[We accept no responsibility for the statements made or the opinions expressed by our correspondents.]

AUSTRALIAN EMIGRATION

To the Editor of the FOUNDRY TRADE JOURNAL

SIR,—We have to acknowledge your letter of September 13 in reply to our enquiry *re* the prospects of obtaining foundry labour from England, and have read with interest copy of letter received by you from Australia House on the subject.

We have had several applications in response to the notice you were so kind as to insert in the JOURNAL, and we are now going into the matter with the authorities at this end. The great problem is to arrange for suitable accommodation. The housing shortage is very acute here, and is really the controlling factor in migration schemes, and until the lag in building is overtaken, it will be extremely difficult to provide for the migration of family men, so far as the capital cities are concerned.

However, we do appreciate very much indeed the assistance you have so courteously given, and as this may reach you some time near the Christmas season, we take the opportunity of extending our best wishes, with the earnest hope that your days of austerity will soon disappear and that Britain will reap the reward of the splendid efforts now being made to rebuild her trade.—Yours, etc.,

GRAHAM CAMPBELL FERRUM COY. PTY. LTD.
N. E. Weekes, Secretary.
Geelong Road, Footscray, W.12, Victoria.
November 12, 1948. (Delayed in the post.)

The Institute of Metals

The Institute of Metals Medal (in platinum) for 1949 has been awarded to Dr. William Hume-Rothery, F.R.S., in recognition of his outstanding contributions to the science of non-ferrous metallurgy. The President will present the medal at the Annual General Meeting of the Institute in the Hall of the Institution of Mechanical Engineers on the morning of Wednesday, March 30, 1949.

Membership Development: Suspension of Entrance Fees.—In connection with the campaign initiated by the President, to bring about a really large increase in the membership of the Institute—particularly in the present year—the Council has resolved to suspend the entrance fee, with effect from January 1, 1949, for a period of two years, after which the matter will be reviewed.

1949 *Autumn Meeting in Paris.*—The 1949 autumn meeting will be held in Paris in September, and it is hoped that there will be a large attendance. The dates have not yet been definitely fixed, but it is anticipated that the meetings will commence on September 26. Members will receive further particulars at an early date.

MR. E. W. HORLEBEIN, president and general manager of Gibson & Kirk Company, Baltimore, Maryland, has been nominated president of the American Foundrymen's Society. The vice-president nominated is Mr. Walton L. Woody, managing director, National Malleable & Steel Castings Company, of Cleveland, Ohio.

Forthcoming Events

(Secretaries are invited to send in notices of meetings, etc., for inclusion in this column.)

FEBRUARY 14.

Institute of British Foundrymen.

Sheffield Branch :—"Refractory Materials in the Foundry Industry," by A. T. Green and Dr. G. R. Rigby, at the Royal Victoria Hotel, Sheffield, at 7.30 p.m.

Institution of Production Engineers.

Halifax Section :—"Development in High Frequency Heating of Metals," by T. G. Tanner, at Whitley's Café, Westgate, Huddersfield, at 7 p.m.

FEBRUARY 15.

The Association of Bronze and Brass Founders.

Midland Area :—Informal meeting of Members at the Victoria Hotel, Wolverhampton, at 12.45 p.m.

FEBRUARY 16.

Institute of Welding

North London Branch :—"Conveyors," by A. T. C. Burrows, B.Sc., at Acton Technical College, High Street, Acton, London, W.3, at 7.30 p.m.

Royal Statistical Society.

Industrial Applications Section—North-Eastern Group :—"Probability and the Experimenter," by E. D. van Rest, at the Newcastle Chemical Industries Club, 18, Lovain Place, Newcastle-upon-Tyne, at 6.30 p.m.

FEBRUARY 17.

Institution of Production Engineers

Glasgow Section :—"Valid Incentives," by E. C. Gordon England, at the Institution of Engineers and Shipbuilders in Scotland, 39, Elmbank Crescent, Glasgow, at 7.30 p.m.

Leicester Section :—"The Application of Colour in Factories," by Neville Sykes, A.M.I.Mech.E., at the Leicester College of Technology, The Newarkes, Leicester.

FEBRUARY 18.

The Institute of Metals.

Birmingham Local Section :—All-day Symposium on "Techniques of Metallurgical Investigation," at the Chamber of Commerce, New Street, Birmingham.

Institution of Works Managers.

Manchester Branch :—"Occupation and Health," by Professor R. E. Lane, at the Engineers' Club, Albert Square, at 6.30 p.m.

Institute of British Foundrymen.

Falkirk Section :—Annual Business Meeting in the Smoke Room of the Temperance Café, Lint Riggs, Falkirk, at 7 p.m.

West Wales Section :—"Gates and Risers," with film illustrations, by Gordon Jones, in Glanmor Foundry Canteen, Llanelly, at 7 p.m.

FEBRUARY 19.

Bristol Branch :—Short Paper Prize Scheme, at the Grand Hotel, Broad Street, Bristol, at 3 p.m.

75th Anniversary Awards

Ley's Malleable Castings Company, Limited, held a Jubilee dinner on February 5 in the canteen at Derby to celebrate the 75th anniversary of the founding of the firm. No fewer than 550 members of the firm who had completed 21 years' service were present, and there were 25 present who had been with the firm for over 50 years. These included Mr. Ernest Wood, who had 62 years' service; Mr. Edward Wibberley, 60 years; and Miss Keeton, 62 years. After the dinner, clocks and watches were presented by Mr. Francis Ley, managing director and grandson of the founder, to 219 men and women who had lately completed their 21 years.

All the guests received a jubilee book commemorating the history of the firm, and an entertainment was held after the dinner.

Steel Foundry Research*

Phases of investigational work in Progress

By Tom Bishop, B.Met., and K. G. Lewis, M.Sc.

Fluidity and Sand "Burn-on"

A review of all known work on fluidity testing of steel has indicated that the most satisfactory method of studying this property is by means of the spiral mould used in U.S.A. (Briggs, Rominski and Taylor), but this existing method requires development before it can be considered capable of giving reproducible results. It has been found that the rate of entry of the metal into the spiral affects the fluidity index, despite the provision of an overflow. Considerable development work has been carried out to overcome this difficulty. A pre-heated pot with a standard nozzle and plunger has been incorporated in order to control the rate of flow and to improve temperature control. A segmented ladle of 1-cwt. capacity has been constructed and fitted to a constant-speed tipping apparatus in order to speed up the test and to obtain a complete series of results from

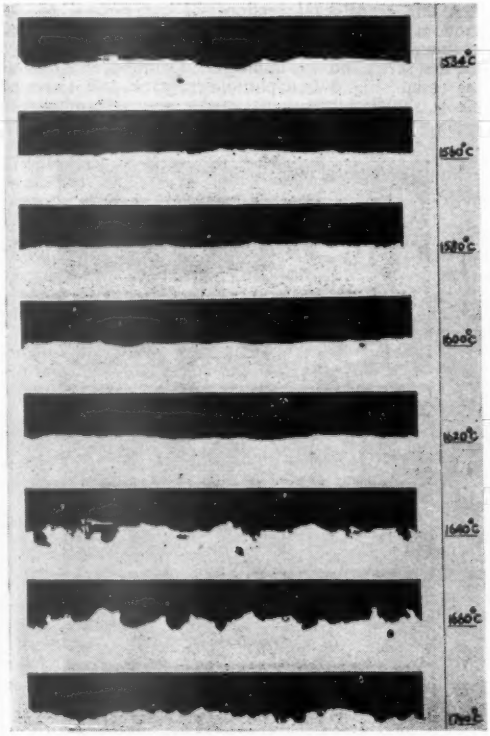


FIG. 1.—SERIES OF PROFILES SHOWING METAL PENETRATION INTO SAND AT VARIOUS TEMPERATURES. (ORIGINAL, × 15.)

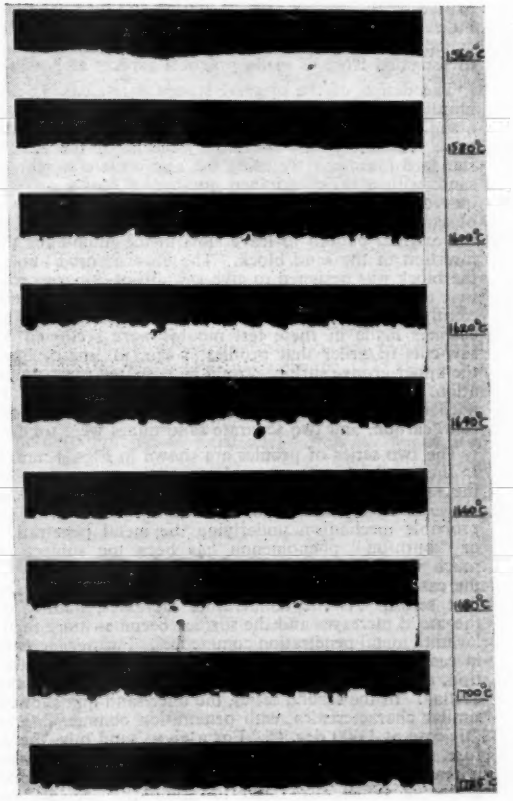


FIG. 2.—SERIES OF PROFILES OF METAL PENETRATION INTO A DIFFERENT TYPE OF SAND MOULD AT VARIOUS TEMPERATURES. (ORIGINAL, × 15.)

Steel Foundry Research

one heat. It is hoped in this way to standardise the factors affecting fluidity testing and to apply the standardised test to the steel casting industry in order to effect reliable routine control of metal prior to casting—a practical contribution which will undoubtedly be of real value to steel-foundrymen.

The effect of casting temperature upon the surface of a standard test casting made in a sand mould of set character has already been the subject of an interim report. Investigations are continuing and a further report is being prepared for publication. Qualitative investigations have been conducted to establish the nature of the changes in constitution of the mould-face materials caused by the presence of the casting and thus to obtain indications of the types of reaction likely to be associated with "burn-on" of sand. The question has been investigated from as many practical aspects as possible.

The design of the original standard test casting and mould has been modified so as to provide in the mould a sand face which has been rammed to a standard degree. Ramming was effected by means of the A.F.A. standard rammer. By using the appropriate weight of sand, with a pre-determined number of blows, any required degree of ramming could be obtained on a block of sand of a particular depth. A print was attached to the original pattern to leave slots in the mould for the insertion of the sand block. The groove cored out by the block was designed to give a width of 2 in. in order that the upper surface of the groove could be of sufficiently large area for satisfactory examination. The castings made in these test moulds were sectioned by saw-cuts in order that profiles, 1 cm. in length, from the upper-groove surfaces could be prepared for examination. The metal was melted in a high-frequency furnace to give a target composition of 0.20 to 0.25 per cent. carbon, and two separate sand mixes were used.

The two series of profiles are shown in Figs. 1 and 2. In the standard casting, metal penetration commences in the range of 1,620 to 1,640 deg. C. for one sand, and between 1,580 and 1,600 deg. C. for another. The probable mechanism underlying the metal penetration or "burn-on" phenomenon has been the subject of much study. A tendency to cold lapping is shown in the case of the 1,534 deg. C. casting temperature in the first series. As the temperature increases, fluidity of the metal increases and the surface becomes more regular until metal penetration commences. Further increase in casting temperature does not give increased penetration, possibly owing to the relatively light section of the casting. In the second series, the finer sand mix showed similar characteristics, with penetration commencing in this case at 1,600 deg. C. For a given sand mix, therefore, and with increasing casting temperature, a point is reached at which the rate of heat transfer to the sand grains is sufficiently rapid to allow the increasingly fluid metal to penetrate between the grains before the formation of a solid skin on the casting. The phenomenon of "burn-on" or sand adherence, however, is not purely mechanical. Visual examination of castings has shown that certain definite changes occur in the constitution of the sand adjacent to the casting after contact with the molten steel, such changes taking place to some extent whatever the surface condition of the casting. When the casting strips cleanly, the immediately adjacent sand peels off in the form of a cohesive cake of grey shiny texture. With increasing deterioration of casting surface, however, sand begins to adhere until it becomes impregnated with steel and cannot be detached from the casting, *i.e.*, severe "burn-on." Provision was therefore made for a further investigation into the constitution of the sand-cake, in the hope that evidence might be provided for the determination of conditions at the mould face which govern the ease with which the sand can be removed. This latter investigation consisted of petrological and X-ray examination and chemical analysis.

X-Ray and Petrological Examination

A thin translucent section was cut normal to the sand:metal interface from a sample of the sand agglomerate removed from the 1,600 deg. C. casting of the first series and was impregnated with bakelite mounting resin. Fig. 3 is a photomicrograph, using crossed nicols, showing the original quartz grains, together with a glassy constituent or slag between the grains. This

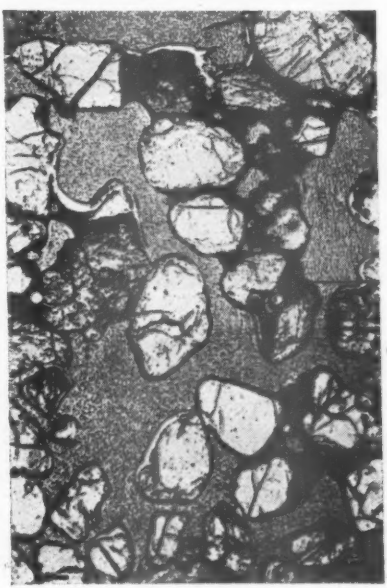


FIG. 3.—PHOTOMICROGRAPH OF SAND AGGLOMERATE NEAR SAND:METAL INTERFACE. × 40.

penetration, in some instances, extends as far as 0.3 cm. from the sand:metal interface. The slate-grey coloration of the sand cake was due to the presence of this constituent, suspected as consisting largely of fayalite, $2FeO.SiO_2$. No evidence was observed of free iron oxides or separate constituents. X-ray diffraction patterns were taken of the moulding sand prior to casting, as well as the sand cake from the 1,600 deg. C. casting; and a sample of fayalite (containing also 15 per cent. forsterite); the results are seen in Fig. 4. It was assumed, therefore, that the numerous lines on film (*b*), not present on film (*a*), were due to the presence of another phase or phases arising from reactions at the mould face. Comparison of films (*b*) and (*c*) showed that practically all these additional lines could be accounted for by the fayalite diffraction pattern. The smaller lattice parameters in the fayalite sample could be accounted for by the presence of the 15 per cent. forsterite. The indication is, therefore, that the major constituent of the slag is fayalite, the ortho-silicate of iron. $2FeO.SiO_2$. The predominant proportion of ferrous iron, shown by chemical analysis, would appear to supply further confirmation of the existence of the iron, particularly as this silicate is the most probable stable phase in view of the limited supply of oxygen. The findings to date are certainly of the greatest interest, but a number of items still require elucidation. There is no evidence to indicate whether the fluid silicate tends to encourage metal penetration by capillary attraction between the sand grains or whether it is sufficiently viscous to inhibit penetration.

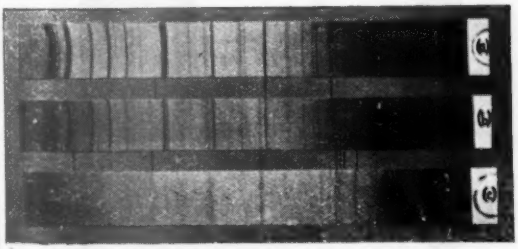


FIG. 4.—X-RAY DIFFRACTION PATTERNS OF:—(*a*) MOULDING SAND PRIOR TO CASTING; (*b*) SAND CAKE FROM A "1,600-DEG. C." CASTING, AND (*c*) A SAMPLE OF FAYALITE CONTAINING 15 PER CENT. FORSTERITE.

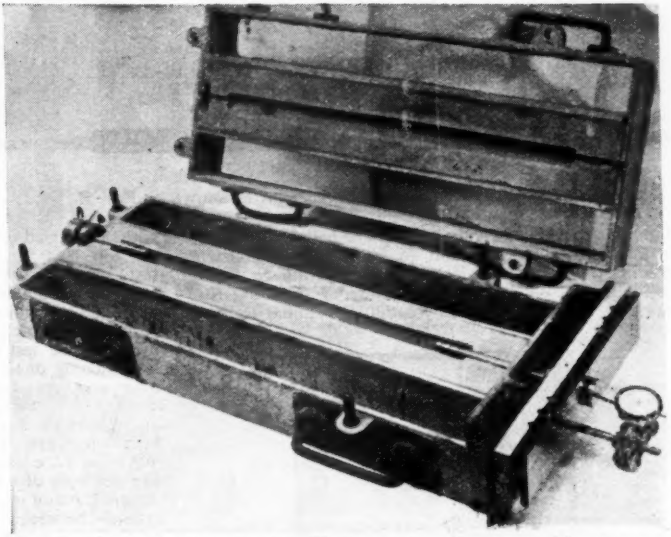


FIG. 5.—APPARATUS USED AT THE UNIVERSITY OF SHEFFIELD, METALLURGY DEPARTMENT, FOR THE DETERMINATION OF SUSCEPTIBILITY OF CAST-STEEL BARS TO HOT-TEARING.

Briefly, this work on "burn-on" at the University of Sheffield has now shown that a chemical reaction occurs at the mould face between the iron oxide of the metal and the sand adjacent to the casting. Metal penetration increases with casting temperature, and increase in the carbon content of the steel lowers the temperature at which the penetration takes place. Penetration occurs at a lower temperature with a fine-grained than with a coarse-grained sand. Mould density does not appear to have any effect over a range of one to thirty rams for the test specimen.

Hot-tearing

Research work on hot-tearing was preceded by a review of the literature, particularly with reference to the factors which cause this defect. Attention is drawn to the fact that hot-tears can be external or internal as related to the casting and consideration has been given to the mode of occurrence in both cases. The former type occurs because the casting, or a portion of it, is under a sufficient stress to cause cracking. This stress can arise from a variety of causes, such as casting design, mould construction, and the manner in which the metal cools. Stresses are concentrated at discontinuities, sharp corners and abrupt changes in section in a manner sufficient to tear the metal. It is considered that external tears occur when solidification is complete.

E

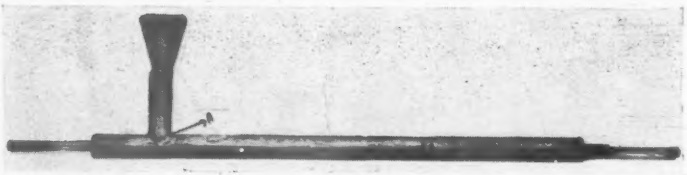


FIG. 6.—THE TEST-BAR FROM APPARATUS SHOWN IN FIG. 5.

Internal tears, on the other hand, are believed to occur at higher temperature and to be due to insufficient feeding of molten metal to allow for shrinkage during solidification, *e.g.*, tears radiating from small internal cavities. They are caused by conditions similar to those

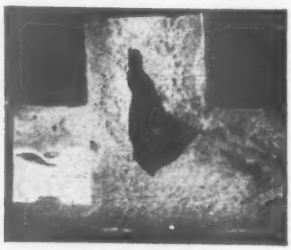


FIG. 7.—POROSITY AT BOTTOM OF RUNNER.

causing external tears, *i.e.*, temperature gradients, causing "pull" between solidified and partially solidified metal or metal at a higher temperature. The internal tear, however, is of a more insidious character and seldom reaches the surface of the section, since the skin

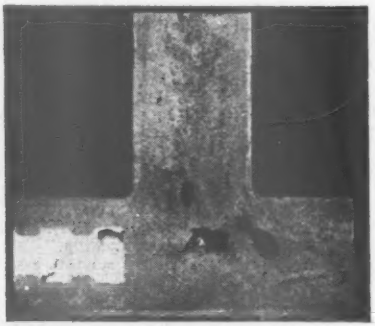


FIG. 8.—POROSITY AT POSITION WHERE TEARING TAKES PLACE.

of the latter is at a sufficiently lower temperature to withstand the stress.

Obviously, the study of hot-tearing necessitates some form of restraint to the cooling metal. The apparatus now used at Sheffield University for the determination of susceptibility towards tearing is shown in Fig. 5, and consists of a specially designed two-part moulding box, the bottom half being constructed with a stepped-up portion at one end against which the top half fits. A round bar is the form of the test casting, the cast metal welding on to two steel bolts previously placed at either end of the box, and of which the portions to be located in the casting are notched to ensure gripping by the cast metal. The test-bar is held tight at the pouring end by fastening one of the bolts to the moulding box, the other end being free to move as the bar contracts. This movement is hindered by means of a spring (mounted on rollers) the bending moment of which is measured by a dial gauge. Use of the bolt ensures that comparative results are obtained, as variations in ramming density and bulk of moulding sand will have no effect upon the contraction of the test-bar, a 20-in. length of which extends between the runner and the end of the bar nearest the spring. The above is only a superficial description of the equipment, full details of which will be published in the near future. A photograph of the test-bar is shown in Fig. 6. A number of springs of different span allow load-deflection curves to be plotted for a particular condition of casting, but it must be remembered that the spring in use at any one time has to be assembled prior to casting. Thus care must be taken when ramming up the centre position of the moulding box to ensure alignment of the test-bar pattern.

FIG. 9.—SOUNDNESS AT BOTTOM OF RUNNER OF MODIFIED DESIGN.

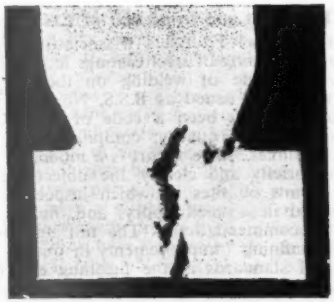


FIG. 10.—TORN TEST-BAR—ALTHOUGH FEEDING APPEARS ADEQUATE.

Actual Test Procedure

The same mix of sand was used throughout and the steel for all experiments was melted in a high-frequency furnace to give 0.20 to 0.25 per cent. carbon, the metal being cast into the mould as quickly as possible when the casting temperature was reached. Temperature and contraction figures were taken every 5 secs. until the runner position of the test-bar had cooled to approximately 1,200 deg. C. The standard form of test-bar now developed is capable of yielding satisfactory results. The tearing occurred at the hottest spot—immediately below the runner. It was also observed, when using runner and test-bar of the same cross-section (1.128 in. dia.), that a considerable amount of porosity existed at the bottom of the runner and at the position where tearing took place (Figs. 7 and 8). Such a state of affairs led to irregular results and the shape and size of the runner were modified to give increased section and adequate feeding of the bar. The degree of improvement attained is well illustrated in the sections shown in Figs. 9 and 10, respectively, of a sound and a torn test-bar. Tearing occurred at higher temperatures than those obtained with the test-bars using smaller diameter runners, but the intervals between casting and tearing were of the same order.

By the method of testing described, regular and reproducible results have been obtained, the tearing always being located at the hottest portion of the casting. In the class of steel tested (0·20 to 0·25 per cent. C.), tearing always occurred above 1,367 deg. C. The temperature of tearing is not a constant for a particular steel, but is affected by the casting temperature and the intensity of the hot spot. The former is an important influence with regard to susceptibility to tearing, since a test-bar cast cold will withstand a greater resistance to contraction than a similar bar cast hot. As the casting temperature is lowered, the temperature at which tearing occurs is lowered and the stress required to cause tearing is increased. With regard to the intensity of the hot zone, the work has resulted in a finding of importance—a casting with a less intense hot spot, but having considerable shrinkage cavities, may withstand greater loads than a sound casting with a more intense hot spot. The pointer to correct designing of a casting, *i.e.*, to reduce such

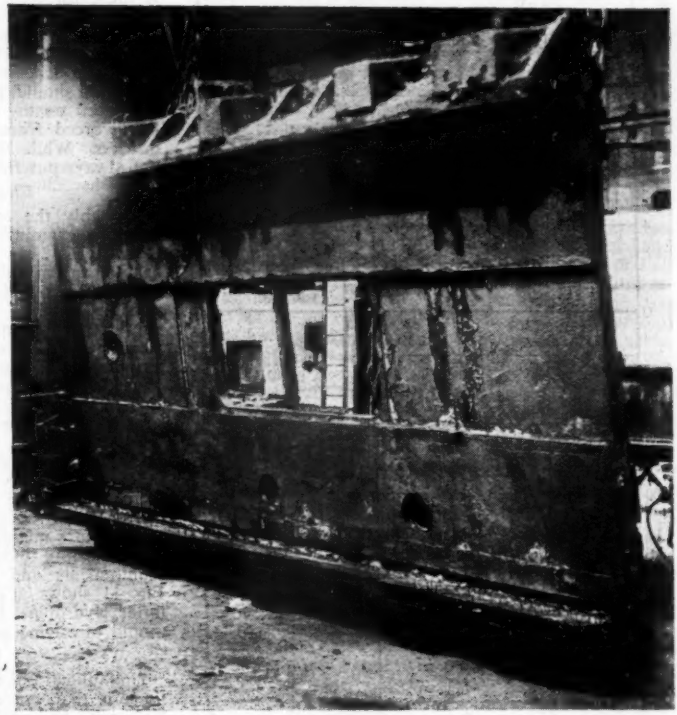


FIG. 11.—BOTTOM PART OF A STEEL SECTION AFTER CASTING IN AN OLIVINE SAND MOULD AND HYDRO-BLASTING.

Steel Foundry Research

zones to "minimum intensity," is obvious, although it may well be that a degree of compromise may be necessary.

Effect of Composition

With reference to composition, the Sheffield results have now shown that an increase in the carbon content above 0·20 per cent. increased the susceptibility to hot-tearing. Carbon contents below 0·2 per cent. also showed an increased tendency, but only at high temperatures. With the 0·2 per cent. carbon steel, increase in sulphur from 0·035 to 0·072 per cent. resulted in an increased hot-tearing tendency, tearing occurring at higher temperatures and lower stresses. Phosphorus also increased the tendency to hot-tearing.

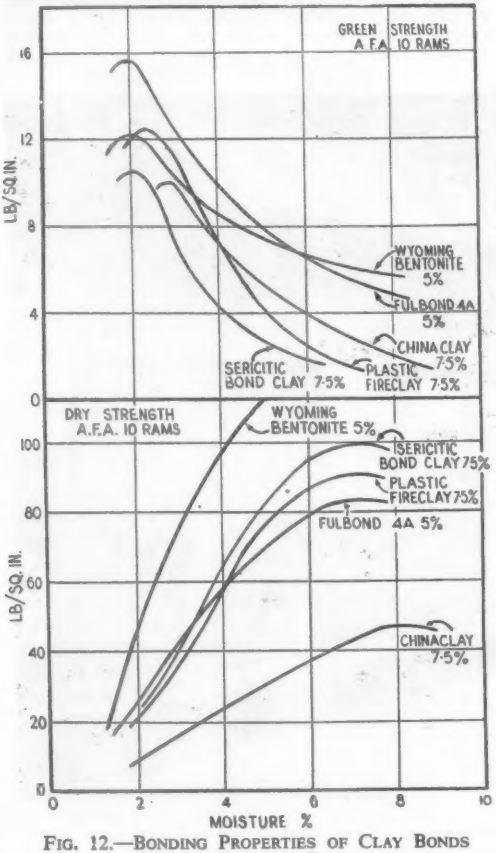


FIG. 12.—BONDING PROPERTIES OF CLAY BONDS WITH CHELFORD SAND.

Treatment and Inspection of Castings

The British Steel Founders' Association's investigations into the welding of steel castings led to the establishment of a code of welding on the subject and this has now been issued as B.S.S. No. 592. A similar development has been a code of inspection procedure, or code of quality, compiled from a large number of sources. The report is a model of its kind, comprising briefly and clearly the objects of inspection; the points or sites at which inspection is normally applied in a steelfoundry; and, finally, conclusions and recommendations. The not unknown procedure of confining "improvements in quality" to the tightening of standards at the finishing end is firmly condemned. "Inspection must be applied progressively at all stages of manufacture to ensure that work is properly carried out at each stage before passing on to the next, defective work discovered at each operation being thrown out and scrapped." Such a gospel is worthy of greater circulation. A pleasing aspect is the considered feeling that jobbing foundries might find many of the conclusions drawn are not applicable to themselves and, to provide for this possibility, recommendations have been drawn up in tabular form to assist a scheme of inspection for jobbing foundries. Attention should, perhaps, also be drawn to the emphasis placed on the necessity for inspection personnel to be divorced from those directly responsible for production. While this thesis is generally accepted, it is not always put fully into operation.

Choice of Moulding Sand

Probably the most important development arising from an examination of British sands carried out in recent years has been that many foundries were enabled to draw their supplies from sources of a more local character than was previously thought to be possible, with, of course, considerable saving in attendant transport requirements. Further trials with Norwegian olivine sand have confirmed that easier stripping and improved casting surface can be obtained. Its use in a sand-reclamation system is now being considered. Norway is, at the moment, the only source of olivine sand in Western Europe and, consequently, work is in hand using the serpentines to be found in Scotland, the Shetlands and Cornwall, incorporated in each case with synthetic materials. It is proposed in the near future to have one steelfoundry using only olivine sand. It was hoped that certain native refractory silicates might have proved successful as moulding materials, but those so far tested have not answered requirements and further materials are to be tried. Fig. 11 shows a photograph of a large steel casting (after Hydroblast treatment) which has been cast in a mould of olivine sand.

Bonding of Sands

Undoubtedly, the most extensive of recent investigations is that carried out by Dr. White at Sheffield University on bonding materials. The great superiority of Wyoming bentonite as a bond is well shown for both green strength and dry strength values in Fig. 12, but this material became scarce during the war and

substitutes had to be found. The more recent development has been the search for a montmorillonite bond of either native (British) or "soft currency" origin. Latterly, these investigation have been intensified to meet the exigencies of the present economic situation. The montmorillonite clays are the main clays of bentonites, corresponding to the kaolinite clays as the main constituent of firebrick and of plastic clays generally. The latter have a high green-strength and a relatively low dry-strength, while the montmorillonitic class have a slightly lower green-strength, but a high green-strength/dry-strength ratio. Recent *ad hoc* investigations have concerned the examination of the bentonites from New Zealand, North Africa, Cyprus, Kenya and Italy. Properties similar to those of Wyoming bentonite have been observed in the Italian material and in certain selected bentonites from North Africa. One of the latter is to be made available to the industry in a processed form to ensure uniform quality.

In studies of this kind, particular attention has been paid to characteristics and foundry behaviour. It has been observed that laboratory trials were not simulating foundry conditions, due, to a great extent, to the mechanism of bonding not being properly understood. Dr. White's fundamental studies have done much to eradicate this state of affairs. These investigations are of a long-term character, designed to establish the physical and chemical relationships involved in bonding action. One aspect of this work is the study of the rheological properties of bonds, while another is the study of the surface energy relationships between bonds and silica. Work is also proceeding on the constitution of bond clays, including studies of their dehydration characteristics and hygroscopic properties. It is possible that these properties may be of value in supplementing X-ray and petrological examination for the identification of the clay minerals, quite apart from their importance in the foundry.

ARRANGEMENTS ARE BEING MADE for the workpeople engaged in the engineering industries to visit, as groups, the Engineering and Marine Exhibition which is to be held at Olympia this year from August 28 to September 10.

---

and another benefit not to be taken into account is where meals are provided for the staff (*e.g.*, canteens).

While the references in this article have been made as if only companies are concerned, the provisions explained apply to unincorporated societies and other bodies, the same as they do to corporate concerns, and with the relevant modifications of terms to partnerships and individuals likewise.

Conclusion

Government spokesmen stated, when the provisions were going through Parliament, that this new system had been introduced because the Revenue authorities had claimed that large amounts were being entered as expenses in some cases, and it was thought that this method of smaller fees and salaries and large expenses was introduced to escape taxation.

Expenses Allowances

By F. J. Tebbutt

The Finance Act, 1948, devotes nine sections to new procedure concerning allowances for directors and employees for income tax; therefore, these few hints are given showing the present position. Under Schedule D (business profits; persons on own account) all *bona fide* remuneration of employees (term includes directors), for employers' assessments, is deductible as a trading expense, coming under the rule of "money wholly and exclusively laid out or expended for the purposes of the trade, profession, or vocation."

For Schedule E (employments), the new provisions of the Finance Act, 1948, that is as regards income of the recipient, come into force. By these new provisions, any sum paid in respect of expenses by a concern to any of its directors, or to any employee with emoluments of £2,000 per annum or more (such expenses included) shall, if not otherwise chargeable with tax as income of the director or employee, be chargeable with tax as a perquisite of the office or employment and included in the emoluments assessable to tax. But this does not mean that no deduction for expenses is allowable before tax is payable; ordinary expenses will be allowed, that is such as come under the rules of Schedule E, particularly that rule which gives allowances for "money expended wholly, exclusively, and necessarily in the performance of the duties of the office or employment." Under this rule travelling expenses incurred in carrying out the duties of the employment are allowable, but this does not include allowances for expenses incurred in travelling to and from place of residence and business. The general assessable position will be that all amounts received as fees or salary, and also all sums received and called expenses will be assessable to tax, these sums thus being considered as part of the emolument, but against this amount, before tax is payable, will be allowed ordinary expenses incurred in doing the job.

Employers must include all expenses as above in the returns of remuneration of employees and directors which are required from time to time by the Revenue authorities.

Points of Interest

Ordinarily, benefits in kind are to be included; thus, roughly all payments for expenses, accommodation provided, entertainment, services, benefits and facilities generally are to be considered as part of the emoluments and so assessable. Of course, if the recipient has paid back any sum concerned, or makes any such payment himself, that is another matter; and of interest, too, are the following exceptions, where benefits in kind are specifically excluded by the Act. Thus, excepted is the provision by the concern of office accommodation, services, and supplies used solely by the director or employee in the performance of his duties; living accommodation provided an employee (this does not apply to a director) on the business premises, the employee being required by tradition or necessity to live on the premises;

(*Concluded at the foot of column* 1.)

Foundry Drying Systems*

DISCUSSION

Mr. E. N. Smith, of Foundry & Engineering Company (West Bromwich), Limited, in a written contribution, states:—

Pressure Drying

The Paper covers a fairly wide field and raises many debatable points. With regard to heavy-mould drying, one important factor, which the author appears to have overlooked, is that of "penetration" due to a slight static pressure set up in the stove by forced draught and maintained by sufficient "resistance" at the exhaust. Considerable light is thrown on this aspect by very exhaustive tests on a large stove fired from a standard pattern natural-draught furnace, carried out some 10 or 12 years ago by a well-known Sheffield steel foundry, which recorded both actual stove temperatures and temperatures inside large moulds, the latter by means of thermocouples buried in the sand. The stove was subsequently converted to the "pressure" system. by fitting a forced-draught furnace and exhaust controls, these being the only alterations. Comparative average figures over a number of tests were as recorded in Table I.

TABLE I.—*Stove and Mould Temperatures with Alternative Firing Methods.*

Time (in hours) from commencement of firing	3½	4	8	12	16½	20	23	25	26
Natural draught—									
Stove temperature, deg. C.		200		250		275	300		350 (max.)
Mould temperature, deg. C.		25		50		100	190	200 (max.)	
Pressure system—									
Stove temperature, deg. C.	200		220	240	260 (max.)				
Mould temperature, deg. C.	100		180	210	250 (max.)				

It should be noted that these are comparisons made on an existing stove and not by any means the best obtainable with a stove of modern construction.

Re-circulation

Considerable economy in fuel may be effected by utilising re-circulation with electrical heat treatment, and it is understood that a small economy may be achieved even in core and mould drying if the hot gases be rushed through the stove at high velocity (as the article suggests), and reach the base of the stack at a relatively high temperature with only a small percentage of moisture. Under the pressure drying system, however, the products of combustion and auxiliary air become so moisture laden and reduced in temperature on the first passage through the stove, that they are quite useless for re-circulation.

Vertical Continuous Stoves

With regard to the vertical continuous core stoves (a No. 2 Acme Junior is illustrated), Mr. Morton's description appears somewhat misleading. The essential principle of all these stoves is 3-stage drying—first, heating up; second, oxidising and completely baking, using a separate air supply; and, third, cooling. In the original large-capacity model, each stage occupied a separate chamber, but in the smaller model the three stages are modified into a single complete loop. The fumes and spent gases are exhausted from two points just above the loading level, inside the casing, and not from the top of the stove as might be supposed from the Author's description and the illustration.

The statement that "there is no flexibility" in this type of stove, and that "more often than not cores are produced faster than the stove will dry them," is certainly unwarranted. There are eight ranges of standard speeds and a minimum of four speeds is supplied. Additional speeds can be obtained at very small extra cost if required. The Author suggests, also, that a 12-lb. core is the maximum size which can be dried, in the stove illustrated, in one cycle, but omits to mention the maximum thickness, which is only one of other important factors. To quote an extreme case, a ¼-oz. and a ¼-cwt. core have both been satisfactorily dried, side by side, on the same tray. Whilst one would not usually advise drying cores of so greatly contrasting sizes in this manner, this was an actual test taken and illustrated in the FOUNDRY TRADE JOURNAL by the late Mr. F. J. Cook about 10 years ago.

These stoves are built in standard or special units, with a capacity of from 100 sq. ft. to over 2,000 sq. ft. of coreplates per hour. Some firms have as many as 16 in use, mostly of the larger range. They are in operation all over the world, and many hundreds have been installed in this country.

With reference to the labour involved, the writer has seen as many as three or four men in attendance on this type of stove, ostensibly for loading and unloading, but this is unnecessary and wasteful, as with proper organisation one man is quite capable of loading, unloading and firing a stove of the size illustrated.,

Mechanised Loading and Unloading

The idea shown in Fig. 13 of the original paper is not new to the writer, but he has yet to be convinced that the advantages accruing from a completely automatic arrangement such as this are not outweighed by the volume of synchronising and other gear required and the resulting increased supervision and maintenance costs. Furthermore, to use a system of this type for small and medium sized cores would reduce the stove capacity, since with any type of automatic loading much greater clearances are necessary. On the other hand, for dealing with really heavy cores there is no appreciable loss of stove capacity with autoloading, as two tiers would rarely be possible, but all

(*Continued on facing page at the foot of Col. One*)

* Paper awarded the John Surtees Gold Medal, printed in the JOURNAL, December 30, 1948, and January 6, 1949.

Recent Developments in Cast Iron in the U.S.A.

According to "Materials and Methods," the metallurgical goal of producing a nodular graphite in cast iron during the casting and solidification period seems to be closer to achievement from several directions. The A.F.S. meeting in Philadelphia was told of British progress in that direction by Mr. H. Morrogh. At the same time, United States progress has reached the point where commercial tests are being made on nodular graphite cast iron.

Although different methods are used to achieve the results, the properties are reasonably close in the American and British methods. In the American process, a small amount of magnesium (or magnesium-containing addition agents, such as a nickel-magnesium alloy) is introduced into the iron. Added in the proper amounts, magnesium increases the iron's strength several times and improves impact properties. Properties vary in accordance with the base material, but a base iron which has an as-cast tensile strength of 11 to 13.5 tons per sq. in. will probably come out with a 29 tons per sq. in or higher tensile strength, depending upon the graphite content. With a low phosphorus content, the iron may have its elongation doubled or tripled. It will probably be a year or more before cast irons of this type become available, but their advent will be welcomed by many users of cast irons.

An interesting bit of news came from the Central Foundry Division, General Motors Corporation, when the revelation was made that this foundry is now producing 100 per cent. annealed soft grey-iron castings. It is believed that this is the first application* of such magnitude to involve annealed castings. Benefits are reported as including tool life four times that normally attained in machining and freedom from hard spots.

[*This process has been used by makers of textile-engineering castings in Lancashire and by foundries in the Black Country for many decades.—EDITOR.]

(*Continued from facing page*)

lifting of cores is eliminated by using roller loading gear and finger-arm trays. Cores can be delivered to the loading point either by standard roller or band conveyor or lifted directly by crane on to the roller loading gear and can be removed by similar methods.

There is quite a number of automatic loading vertical continuous stoves dealing with cores weighing several hundredweights, but it would, of course, not be an economical proposition to instal a stove of this type for dealing with a production composed mainly of small cores. To sum up, the original Paper mentions only one size of continuous core stove and suggests that the application of the system is limited, both with regard to capacity and the range of work which can be handled. In fairness, it should be said that all sizes of stoves have a reasonable flexibility by means of varied speeds, for dealing with a fairly wide range of core sizes and with proper organisation the smallest units operate with the same relative efficiency as the largest sizes.

Notes from the Branches

South Africa

The September meeting was given over to the presentation of a Paper on "Normalising and Annealing," by Mr. A. H. Bryant. Mr. H. Teubes presided and, in opening the meeting, announced that owing to the unavoidable absence of Mr. Bryant, Mr. P. L. Ward had been kind enough to consent to the reading of the Paper on behalf of the Author.

The subject matter of the Paper was wide, and ranged over the whole field of definitions, of steel castings and forgings, pyrometry, microstructure, grain size and furnace practice. The discussion was marred somewhat by the absence of the author. The audience numbered about 30.

Scottish Branch—Falkirk Section

The last meeting of the Section was held as usual in the Falkirk Temperance Café Smoke Room. The President, Mr. John N. Reid, occupied the chair and welcomed the large attendance of members and visitors. As a change from the normal type of meeting, it had been arranged that a film programme be shown, and displayed in an admirable manner the advantages to chosen were "Mechanical Handling," shown by courtesy of the Mechanical Handling Engineers' Association, and "A.1, at Lloyds," shown by courtesy of Mr. Edward Cook. "Mechanical Handling" was in colour, and displayed in an admirable manner the advantages of industry. "A.1 at Lloyds" dealt in detail with all aspects of the manufacture of small, medium and large steel castings, and the precautions taken to ensure maximum performance in service. Both films were accompanied by a sound commentary, and were run through without a hitch. After the presentation of the films, the chairman made several acknowledgments, and asked the secretary to convey to the sponsors the most grateful thanks of the members.

Sheffield

For the first time since 1939, the holding of an "annual" dinner has been revived. The function, which was held on January 31 at the Royal Victoria Hotel, was supported by over 150 members and guests. After the company had honoured the loyal toast, proposed by Mr. H. S. W. Brittain, the Branch president and chairman, "The City and Commerce of Sheffield" was given by Mr. R. B. Templeton, the President of the Institute. It was replied to by the Lord Mayor (Alderman W. E. Yorke, J.P.). The toast of the local branch was given by Mr. F. Pickworth, managing director of the English Steel Corporation, Limited, and was replied to by the Chairman. The final toast of "The Guests" was in the hands of Mr. J. G. Bailes, the vice-president, the reply being made by Mr. B. W. Doncaster, the president of the Sheffield Society of Engineers and Metallurgists. Others gracing the high table were: The Master Cutler (Lt.-Col. J. P. Hunt, T.D.); Mr. F. A. Martin (president of the British Steel Founders' Association); Mr. A. Roebuck (president of the Sheffield Metallurgical Association); Mr. T. Makemson, M.B.E., and Dr. C. J. Dadswell, a past-president of the Branch.

Institute Elects New Members

SECOND LIST.

(*Continued from page* 99.)

As Associates (*Over* 21)

L. B. Box, design draughtsman, W. A. Turner, Jeffrey & Company, Royston, Herts; I. B. Gillies, laboratory assistant, Argus Foundry, Limited, Glasgow; I. C. Fraser, works metallurgist, The Watford Foundry Company, Limited; F. A. Jasdanwalla, moulder, Langley Alloys, Limited, Bucks; R. A. Perry, foreman patternmaker, John Williams & Sons (Cardiff) Limited; H. P. Rees, patternmaker, Ben Hughes, Loughor Foundry, Glam; W. Scutts, laboratory assistant, Argus Foundry, Limited, Glasgow; I. Strode, assistant foundry metallurgist, Glanmor Foundry & Engineering Company, Llanelly; J. Syme, works chemist, Smith & Wellstood, Limited, Bonnybridge.

As Associates (*Under* 21)

B. S. Hines, student, Stockport & Openshaw Technical Colleges; R. Pollock, apprentice iron moulder, Shanks & Company, Limited, Barr Head; J. Williamson, estimator, Shaw & McInness, Limited, Glasgow.

THIRD LIST

As Members

J. McPheat,* senior analyst, G. & J. Weir, Limited, Glasgow; D. H. Potts, assistant to foundry manager, Westinghouse Brake & Signal Company, Chippenham; N. Scott, foundry foreman, Lemington Glass Works, Limited, Lemington, Newcastle-upon-Tyne.

As Associate Members

H. Brady, assistant foreman, Hepworth & Grandage, Limited, Bradford; J. J. Frankland, chargehand coremaker, E. Green & Son, Limited, Wakefield; D. G. Hall, assistant to foundry manager, Westinghouse Brake & Signal Company, Chippenham; S. Irish, ironmoulder, Noble & Lund, Limited, Felling-on-Tyne; J. McPherson, foundry manager, Hepworth & Grandage, Limited, Bradford; J. F. Shepley, chargehand, Hopkinsons, Limited, Huddersfield; R. M. Smith, patternmaker, Wallsend Slipway & Engineering Company, Limited, Wallsend; T. W. Warner, assistant foreman, Westinghouse Brake & Signal Company, Chippenham.

As Associates (*Over* 21)

A. Blaymires, metallurgical apprentice, English Electric Company, Limited, Bradford; J. Merryweather, moulder, C. A. Parsons & Company, Limited, Walkergate; G. Parker, casting inspector, Hepworth Grandage, Limited, Bradford.

FOURTH LIST

As Members

J. S. Matthew, sales and production manager, Coneygre Foundry, Limited, Tipton.

As Associate Members

W. E. Bourner, foreman patternmaker, W. Shaw & Company, Limited, Middlesbrough; R. W. Cooper, laboratory assistant, British Piston Ring Company, Limited, Coventry; J. R. Cotterill, assistant technical manager, Duport Foundries, Limited, Dudley Port; G. J. Daniell, assistant foundry works manager, Firth-Vickers Stainless Steel Company, Limited, Blackheath, Staffs; J. B. Elliott, foundry superintendent, Humber, Limited, Coventry; H. C. Lloyd, foundry foreman, Coneygre Foundry, Limited, Tipton; H. Thornton, foreman moulder, W. Shaw & Company, Limited, Middlesbrough.

As Associates (*Over* 21)

K. Allport, laboratory assistant, Cochranes, Limited, Middlesbrough; W. Bearne, journeyman moulder, W. Shaw & Company, Limited, Middlesbrough; D. Bourner, journeyman moulder, W. Shaw & Company, Limited, Middlesbrough; V. N. Howells, foundry manager, Cotterell & Sons, Walsall; J. W. Magrs, casting inspector, Ashmore Benson Pease, Stockton; M. C. Mould, apprentice, C. & L. Hill, Limited, Willenhall; F. J. Munroe, patternmaker, Cochranes, Limited, Middlesbrough; C. Preston, assistant foundry manager, Ashmore Benson Pease & Company, Limited; C. Renahan, journeyman moulder, W. Shaw & Company. Limited, Middlesbrough; L. H. Spencer, journeyman moulder, W. Shaw & Company, Limited, Middlesbrough; K. Thompson, journeyman moulder, W. Shaw & Company, Limited. Middlesbrough; A. Waddington, journeyman moulder, W. Shaw & Company, Limited, Middlesbrough.

*Transferred.

50th Anniversary of Borax Consolidated

January 11, 1949, marked the fiftieth anniversary of a concern unique among British chemical enterprises—Borax Consolidated, Limited, London. A constant reminder of the Company's early difficulties in pioneering and exploiting borax mineral deposits in Death Valley, California is retained in the now world-famous "Twenty Mule Team" trade mark. Under extreme conditions, the original twenty mule team handled by "Borax Bill" Parkinson hauled wagons of 20 tons of mineral over 160 miles of alkaline desert in 16 to 18 days.

The discovery in 1926 of the Rasorite mineral deposits in Kern County, California, led to much more economical refining and the entry of borax and boric acid into large-scale industrial development. In England, Borax Consolidated, Limited, since its inception, has refined at Belvedere, Kent, substantial quantities of borax and boric acid from its own imported mineral. Some idea of the growth of the borax industry can be judged from the fact that the world output from all sources, which approximated in terms of boric oxide something like 20,000 tons in 1899, had reached a total in 1947 of 153,400 tons.

Fifty years ago borax and boric acid were chiefly employed in medicine, pharmaceutical products, food preservatives, gold refining, and to a small extent in jewellers' enamels and rare pottery glazes. To-day, over twenty major industries rely upon borax and boric acid in quantity. The most notable developments have been in the ceramic field over a wide range of glasses, vitreous enamels, and pottery and chinaware glazes, which account for roughly half the world's consumption of boron products. A notable post-war development in the U.S. is the pre-fabricated "Lustron" house, built and equipped in porcelain enamelled steel, of which 45,000 are planned for erection in 1949.

Manchester Chair of Engineering

Dr. W. R. Hawthorne's Appointment

Dr. William Rede Hawthorne has accepted the invitation of the Council of Manchester University to become Beyer Professor of Engineering and Director of the Whitworth Laboratories in succession to Prof. A. H. Gibson, who will retire at the end of the present session. Dr. Hawthorne will take up his duties next June. He was an exhibitioner of Trinity College, Cambridge, and was awarded first-class honours in the Mechanical Sciences Tripos in 1934, with distinction in applied mechanics and in heat and heat engines. He gained the Rex Moir Prize and the Ricardo Prize in Thermodynamics, and was awarded a senior scholarship of Trinity College.

From 1934-35 he was a student apprentice, with Babcock & Wilcox, Limited, Renfrew, and was a part-time mathematical instructor in the Paisley Technical College. He was then elected to a Commonwealth Fund Fellowship, which he held in the Department of Chemical Engineering at the Massachusetts Institute of Technology, later returning to this country as a development engineer, working on combustion, heat-transfer, and steam-raising problems. In 1939 he received the degree of Doctor of Science from the Massachusetts Institute for a thesis on the "Mixing of Gas and Air in Flames."

After working on heat-transfer problems in the engine department of the Royal Aircraft Establishment at Farnborough, Dr. Hawthorne was engaged in assisting in combustion chamber design and the development of the Whittle engine with Power Jets, Limited. From 1941 to 1944 he was head of the Turbine Division of the R.A.E. and was later posted to the British Air Commission in Washington, U.S.A., where he was responsible for technical liaison on gas turbines and jet propulsion. From 1945 to 1946 he was Deputy Director of Engine Research in the Ministry of Aircraft Production, and then accepted an appointment as an Associate Professor of Mechanical Engineering in the Massachusetts Institute, where he was later promoted to the status of full professor.

Changes of Name

The following companies have recently changed their names, the new titles being given in parentheses:—

MILLED METALS, LIMITED, Bolton (Wolstenholm Bronze Powders, Limited).

HARRIS & SHELDON METAL FURNITURE, LIMITED, Bilston, Staffs (Sankey-Sheldon, Limited).

BRADLEY & SALTER, LIMITED, engineers, etc., of Cinderford, Glos (W. E. Salter, Limited).

MORGAN METAL TREATMENTS, LIMITED, Birmingham (Metal Treatments (Birmingham), Limited).

HENRY SALKEDD (AUTO COMPONENTS), LIMITED, Lancaster (A. B. Duncan & Company, Limited).

METCALFE IDEAL PRODUCTS, LIMITED, machinery manufacturers, etc., Coventry (C.B.M. Investments, Limited).

HYGIENE PRODUCTS (LINCOLN), LIMITED, manufacturers of stoves, ranges, boilers, etc. (Refrigeration Company (Lincolnshire), Limited).

GEORGE MANN & COMPANY (1932), LIMITED, printing and lithographic machinery manufacturers, etc., of Hunslet, Leeds, 10 (George Mann & Company, Limited). On January 13, 1948, Vickers-Armstrongs, Limited, held 49,992 out of 50,000 shares issued.

The Edwards Cupola Lighter

Any action which a foundryman can take to eliminate a variable is worth while. The use of paper and timber for lighting the cupola is difficult, if not impossible, to standardise. Seeing in our advertisement columns a picture of an apparatus specially designed for lighting cupolas, we asked the maker, Mr. Maurice F. Edwards, of Raven Works, Manchester Road, Bolton, to supply a description of his machine. From this we learn that the lighter, shown in Fig. 1, is mounted on a metal base and is easily portable. A fan is driven by a high-speed ½-h.p. motor, usually 220 to 230 volts a.c., single phase. The fan is made of aluminium and the blades are well balanced. At the side of the fan is a feed pipe for the town's gas supply and an adjustable air valve to obtain

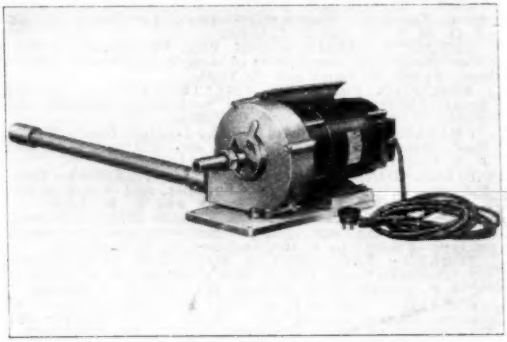


FIG. 1.—MOTORISED CUPOLA LIGHTER SHOWING DETACHABLE NOZZLE.

an intimate mixture with the gas. The blowpipe, which extends from the fan casing, is detachable and is fitted with a cast-iron nozzle. No wood or other kindling material is necessary as a preliminary to the lighting of the coke, but it is recommended that an arch be built with large pieces of coke so that the flame can penetrate to the centre of the shaft. For starting up, first, the gas is connected and the motor started and a light is applied to the nozzle. Then the air is adjusted to give the desired flame, which is directed on to the coke for 20 to 30 minutes. After this period, the fire should be ready for the main blower to be started. The gas consumed is of the order of 430 cub. ft. per hr.; thus the operating cost is quite modest. One Lancashire foundry states that the saving on timber is about £100 a year.

Obituary

MR. THOMAS HORNAL, late of Watson, Laidlaw & Company, Limited, sugar and laundry machinery manufacturers, etc., of Glasgow, died on January 30.

MR. FREDERICK W. MOFFATT, vice-president of Moffats, Limited, electric and gas-stove manufacturers, of Weston, Ontario, and one of Canada's outstanding industrialists, died on January 29. He was 83.

New Companies

("Limited" is understood. Figures indicate capital. Names are of directors unless otherwise stated. Information compiled by Jordan & Sons, 116, Chancery Lane, London, W.C.2.)

LESTER LOCK NUT & WASHER COMPANY—£20,000. H. L. Forgaard, Lawnside, Hagley, Worcs.

NUTT ENGINEERING COMPANY—£10,000. H. A. Y. Nutt, The Spinney, Little Abington, Cambs.

N. MOORE, 164, Slade Road, Erdington, Birmingham—Mechanical engineers, toolmakers, etc., £10,000.

SERVICE ENGINEERING COMPANY (GRIMSBY), 56, Roberts Street, Grimsby—£10,000. H. J. and J. H. Nixon.

GUNTEX, Gunite House, Gt. West Road, Brentford—Engineers, founders, smiths, etc. £5,000. J. E. Good and D. C. Apps.

P. SUMMERFIELD, New Croft Works, St. Anne's Road, Willenhall—Drop forgers. £16,000. P. W. Summerfield and L. Appleby.

JOHN ROTHWELL & SONS, Britannia Works, Gower Street, Farnworth—Sheet-metal workers and engineers. £10,000. S. O., M. L., S., and E. Rothwell.

SANDEN FINISHES, Central Mills, Cleckheaton, Yorks—Wire drawers and bar-drawers of steel, iron and other metals, etc. £5,000. S. Smith and S. North.

PRECISION PRODUCTS (CHELTENHAM), 11, Clarence Street, Cheltenham—General and mechanical engineers, etc. £5,000. J. E. Nicholson and A. Clifford.

CHARLES COOPER (TIPTON), Locarno Road, Tipton, Staffs—General engineers, founders, etc. £12,000. C. C. and F. R. Cooper, C. C., C. E., and H. J. Lathe.

FLUOR-STONE, New Masson House, Matlock Bath, Matlock—Owners and workers of fluorspar, lead, limestone and other mines, etc. £5,000. T. Watson and E. M. Lock.

ESSEX PARTNERS, 56-62, South Castle Street, Liverpool, 1—Manufacturing and general engineers and instrument makers. £10,000. G. E. Goldfinch and W. L. Brotherton.

TURNER'S ENGINEERING FORGINGS, Burley House, 5-11, Theobalds Road, London, W.C.1—£15,000. T. N. Astbury, W. S. F. Mantell, R. W. Thomas, H. J. and G. E. Turner.

DONALD COCHRANE & COMPANY—Manufacturers of tractors, traction engines, etc. £10,000. H. C. Cockett, 150, Westward Road, South Chingford, London, E.4, subscriber.

M'CARTNEY M'DONALD, Balado Airfield, near Milnathort, Kinross-shire—Sheet-metal workers, electro-platers, etc. £25,000. R. and N. E. M. M'Cartney, T. L. and A. T. M'Donald, J. Petrie, and G. R. Scruby.

B.H.D. ENGINEERS, 119, Victoria Street, London, S.W.1—To acquire the whole of the issued capitals of W. H. Holmes & Company and Bryan Donkin Company, and to carry on the business of gas, agricultural, mechanical, and general engineers, etc. £100.

NORFOLK METALS, Old Steel Wharf, Effingham Road, Sheffield—To take over business of manufacturers of ferrous and non-ferrous metals and recovery of metals from scrap, carried on at Sheffield as Sutherland, Zyss & Company. £5,000. T. W. Rhodes. E. T. Sutherland, J. W. Nicholson, A. E. Berry, and J. T. Zyss.

METRO-CUTANIT, 42, Pall Mall, London, S.W.1.—To enter into agreements with Associated Electrical Industries and Cutanit; to carry on, develop, and turn to account the property and assets to be acquired under such agreements; and to carry on business of chemical, mechanical, and marine engineers, etc. £98,000.

HUMGLAS EXPORTS, Humglas House, Carlisle Place, London, S.W.1—To acquire the whole or any part of the business of Humphreys & Glasgow, and to carry on business of gas, water, oil, mechanical and general engineers, etc. £400,000. E. G. Mengel, A. C. and M. G. Congreve, A. G. Glasgow, C. Harris, H. S. Cheetham, G. G. Farthing and G. Helps.

OUT OF 24 CANDIDATES (20 of whom were apprentices) of Guest, Keen & Nettlefolds, Limited, 18 have been successful in their engineering examinations and were presented with their certificates recently by Mr. H. Tollit, a director and general manager of the company.

Increases of Capital

Details of increased capital have been announced by the following companies:—

C. R. TIPPING & COMPANY, LIMITED, engineers, etc., of Leeds, increased by £19,000, in £1 ordinary shares, beyond the registered capital of £1,000.

NORTHEY ROTARY COMPRESSORS, LIMITED, Poole, Dorset, increased by £10,000, in £1 ordinary shares, beyond the registered capital of £15,000.

HARD ALLOYS, LIMITED, High Wycombe, increased by £10,000, in 100 preference and 9,900 ordinary shares of £1 each, beyond the registered capital of £5,000.

FRANK BUTLER, LIMITED, engineers, founders, etc., of Poplar, London, E.14, increased by £2,000, in £1 ordinary shares, beyond the registered capital of £1,000.

BRITISH HARVESTER & ENGINEERING COMPANY, LIMITED, London S.W.1, increased by £50 in 1,000 1s. ordinary shares, beyond the registered capital of £5,000.

BENNETT & TONKIN, LIMITED, manufacturing and mechanical engineers, etc., of London S.W.1, increased by £900, in £1 shares, beyond the registered capital of £100.

INCHBROOK INDUSTRIES, LIMITED, ironfounders, engineers, etc., of Woodchester, near Stroud, Glos, increased by £5,900, in £1 ordinary shares, beyond the registered capital of £100.

E.M.P. (SKEWEN), LIMITED, engineers, etc., of Skewen, Glam, increased by £2,000, in 1,000 ordinary and 1,000 8 per cent. preference shares of £1 each, beyond the registered capital of £1,000.

ALFA-LAVAL COMPANY, LIMITED, manufacturers of centrifugal and other separators, dairy machinery, etc., of Brentford, increased by £40,000, in £1 shares, beyond the registered capital of £35,000.

A. R. VOLK, LIMITED, patentees, manufacturers, mechanical research engineers and machinery dealers, etc., of Handforth, Ches, increased by £200, in £1 ordinary shares, beyond the registered capital of £100.

McKECHNIE BROS., LIMITED, smelters, refiners, etc., of Birmingham, increased by £300,000, in 100 000 preference, 110,000 ordinary and 90,000 unclassified shares of £1 each, beyond the registered capital of £300,000.

H. J. CREESE & SONS, LIMITED, founders, ironmasters, etc., of Thurmaston, near Leicester, increased by £5,000, in 1,000 ordinary and 4,000 5 per cent. cumulative redeemable preference shares of £1 each, beyond the registered capital of £5,000.

JOHN DALE, LIMITED (formerly John Dale Metal Containers, Limited), of New Southgate, London, N.11, increased by £275,000, in 150,000 6 per cent. cumulative preference shares of £1 and 500,000 ordinary shares of 5s. each, beyond the registered capital of £225 000.

DAVEY, PAXMAN & COMPANY, LIMITED, mechanical, electrical and general engineers, etc., of Colchester, increased by £350,000, in £1 4½ per cent. redeemable cumulative preference shares, beyond the registered capital of £350.000. On August 6, 1948, Ruston & Hornsby, Limited, Lincoln, held 349,200 shares.

CROFTS ENGINEERS (HOLDINGS), LIMITED, Thornbury, Bradford, increased by £899,900, in 500.000 5 per cent. cumulative preference shares of £1 and 1.599,600 ordinary original 100 ordinary shares of £1 each have each been subshares of 5s. each, beyond the registered capital of £100. The divided into four ordinary shares of 5s. each.

Recent Shipbuilding Orders

The following are among shipbuilding orders recently announced:—

JOHN I. THORNEYCROFT & COMPANY, LIMITED, Southampton, single-screw Diesel tug for the Shell Petroleum Company, Limited, London.

LITHGOWS, LIMITED, Port Glasgow, single-screw cargo motorship of 9,300 tons dw. for the British & Burmese Steam Navigation Company, Limited.

News in Brief

THE COMBINED TIN COMMITTEE has made further interim allocations for the first half of 1949, totalling 2,685 tons.

THE GENERAL AND PATTERN STORES of the Idle Moor works of Israel Newton & Sons, Limited, tank and cistern manufacturers, of Bradford, were damaged by fire recently.

CONSEQUENT UPON a little improvement in the supply of coke-oven gas, a 15 per cent. cut in gas supplies to Sheffield industrial concerns has now been reduced to 10 per cent.—the same as a year ago.

A YORKSHIRE engineering firm announces that yearly attendances at its works clinic and surgery total over 76,000 at a cost of £2,314. It is computed that 44,363 man-hours were saved last year by the system.

AN ISSUE has been made this week of 360,175 4½ per cent. cumulative preference £1 shares at par and 285,700 ordinary 10s. shares at 14s. a share by George Kent, Limited, manufacturers of meters, industrial instruments, etc., of Luton.

VENESTA, LIMITED, manufacturers of metal foils, collapsible tubes, etc., of Banstead, Surrey, has acquired a new factory in Erith, Kent, to cope with business expansion. The factory is expected to be in full production by the early autumn.

THE CONTRACT for the installation of two intermittent vertical chamber carbonising plants at the Howdon Works, Wallsend, of the Newcastle-upon-Tyne & Gateshead Gas Company, Limited, has been awarded to Gas Chambers & Coke Ovens, Limited, Artillery Row, London, S.W.1. Each plant will have a capacity of 4,000,000 cub. ft. per day.

FOR THE FIRST AWARD of the W. H. Robertson medal and premium the Medal Committee of the Institute of Metals will consider Papers published in the Institute's Journal from March, 1948, to August, 1949, inclusive. Thereafter the annual award will be made in respect of Papers published covering the annual issues from September to August, inclusive.

CHUBB & SONS LOCK & SAFE COMPANY, LIMITED, Wolverhampton, announces that owing to the requirements of the Companies Act, which make it necessary to submit to the annual meeting (usually held in June) consolidated accounts, it will be necessary in future to hold the meeting later in the year. This will mean that henceforward the final dividend on the preferred ordinary shares will be paid in August.

THE OBJECTS of the British Industrialists Association, Limited, which has been registered as a private company with a capital of £2,500, are to promote, preserve and protect, so far as legally practicable, the principle of private enterprise in trade and industry, and oppose or further opposition to the nationalisation of any trade or industry, or any development considered likely to prejudice private trading.

WORKING CONTINUOUSLY since May 25, 1939, No. 1 blast furnace at Clyde Iron Works, Glasgow, of Colvilles, Limited, which was blown out recently for relining, has produced more than 1,500,000 tons of pig-iron. During this period more than 5,000,000 tons of raw material have been charged into the furnace, while the operatives have earned £150,000 in wages. It is hoped that the blast furnace will be ready to resume production about the middle of April.

THE MANCHESTER DISTRICT COMMITTEE of the A.E.U., representing 80,000 workers, has called for a consolidated minimum wage of £6 a week, which would give all skilled workers outside London an increase of 13s. a week. The women members of the A.E.U., now receiving a basic minimum of £2 11s. and a war bonus of £2 2s., are also asking for a consolidated rate on their present composition. Consolidated minima would, if granted, make the war bonuses permanent.

SPEAKING AT THE presentation of awards to apprentices of R. & W. Hawthorn, Leslie & Company, Limited, Newcastle-upon-Tyne, Mr. J. M. Ormston, president of the Tyne Shipbuilders' Association and general manager of Vickers-Armstrongs, Limited, Walker-on-Tyne, said that in the past the shipbuilding industry had achieved its position largely through adaptability, hard work and craftsmanship. He advised apprentices to take every opportunity by all the educational means available to learn their craft so that they might uphold the high heritage of the industry.

THE COMMISSIONERS OF CUSTOMS AND EXCISE have considered the question of the liability to purchase tax of certain articles designed for use as fuel economisers, and have decided that, in future, cast-iron coal saver grids, of types designed for insertion in the fire-space of stoves and ranges for the purpose of substantially reducing the fuel capacity, will be regarded as within the scope of the exemption under Group 11 (*p*) (i) of the tax schedule. This exemption does not, however, cover grids for attachment to grates for the purpose of increasing the height of the fire-bars or of preventing live coals from dropping out.

A DEFENCE SERVICES RESEARCH FACILITIES COMMITTEE has been set up at the invitation of the Royal Society to "consider proposals for the use of service facilities and personnel for assisting scientific research, and to make recommendations to the Council of the Royal Society, the Lords Commissioners of the Admiralty, the Army Council, and the Air Council." The committee will conduct its business through panels of scientists and service representatives who are specially interested in specific projects. At its first meeting panels were formed to cover submarine gravity measurements, surplus explosives, magnetic survey, aerial photography and scientific expeditions.

SIR JOHN CRAIG, chairman of Colvilles, Limited, stated at the annual dinner of the Glasgow and West of Scotland Association of the Institution of Civil Engineers that the British people would not believe that the country was passing through a crisis. Workers, he said, were afraid to face the facts, arguing that if this was a crisis, "long may it continue," because they were better off now than ever before. Sir John went on to say that appeals were continually being made for more productivity, but alongside that was the reduced time in hours, days, and weeks. He could not imagine how there could be increased productivity and at the same time still shorter working hours and longer holidays.

Personal

MR. J. A. SMITH has been appointed a director of Turner & Newall, Limited, Rochdale.

MR. L. W. MOSCROP has resigned from the board of Bylock Electric, Limited, Enfield, Middx.

MR. F. GEORGE has been appointed a director of Zirconal, Limited, Sydenham, London, S.E.26.

MR. C. H. B. FRYER has been appointed to the board of the British Thermostat Company, Limited, Sunbury-on-Thames, Middx.

SIR WILLIAM GUY ROPNER, a director of the Consett Iron Company, Limited, has been elected a vice-president of the Chamber of Shipping.

MR. W. LENAGHAN, general manager, has been appointed a director of William Gray & Company, Limited, shipbuilders, of West Hartlepool.

MR. GEORGE MACBETH MENZIES, managing director of the North British Steel Foundry, Limited, Bathgate, was seriously injured in a recent road accident.

MR. F. J. C. HONEY and MR. K. J. BURTON have been appointed secretaries of the British Employers' Confederation in succession to the late Mr. H. M. Piper.

MR. T. RAMSAY SHAW, manager for G. & J. Paton, engineers' merchants and agents, of Glasgow, has been elected a Fellow of the Association of Secretaries in Commerce.

MR. HARRY YATES, who has been elected president of the Glasgow Chamber of Commerce, is managing director of Smith & McLean, Limited, sheet and bar rollers, of Glasgow.

MR. JAMES FERRIER has become managing director of Rankin & Blackmore, Limited, Eagle Foundry, Greenock. His father, Mr. Hugh Ferrier, is remaining as chairman of the firm.

MR. DANIEL M'CREDIE, who has been employed by C. & A. Stewart, Limited, brassfounders, of Glasgow, for the past 50 years, has been presented with a gold watch on behalf of the directors.

MR. A. HAROLD PLEWS, secretary of the Sheffield Lighter Trades Employers' Association, has been appointed a director of the Neepsend Steel & Tool Corporation, Limited, Sheffield.

MR. ARTHUR CHAMBERLAIN, who has been elected a director of Tube Investments, Limited, is managing director of the Hercules Cycle & Motor Company, Limited, a subsidiary of Tube Investments.

MR. W. TWADDLE has relinquished his position as foundry manager with Broom & Wade, Limited, High Wycombe, to take up an appointment as technical representative with British Ronceray, Limited.

LORD MILFORD, in view of his advancing years, has resigned from the board of Ilford, Limited, manufacturers of X-ray apparatus, of Ilford, Essex. LORD ROCKLEY has been appointed to fill the vacancy.

MR. HAROLD WALKER, engineering manager of John Readhead & Sons, Limited, shipbuilders, etc., of South Shields, who has completed 100 trial trips for the company, has received a presentation to mark the occasion.

MR. V. C. MCDONNELL, formerly production manager of the development and research division of the De Havilland Engine Company, Limited, has left this post to take up an appointment as development manager to Conrad Parlanti Castings, The Foundry, Herne Bay, Kent.

MR. W. G. OGILVIE, chief inspector with G. & J. Weir, Limited, engineers and founders, of Cathcart, Glasgow, has been elected chairman of the Scottish branch of the Institution of Enginering Inspection in place of MR. D. P. MUIRHEAD, Larbert, who has resigned.

SIR CHARLES TENNYSON has retired from the chairmanship of the F.B.I. Industrial Art Committee. He has held this position continuously since its inception in 1920. MR. ERNEST W. GOODALE, a member of the Committee and of the F.B.I. Grand Council, succeeds Sir Charles as chairman.

MR. R. A. MACLEAN has been appointed chairman of the Scottish Committee of the Council of Industrial Design in place of Sir Steven Bilsland, Bt. He has been a member of the Scottish Committee since its formation at the end of 1944 and a member of the main Council since February, 1948.

MR. MICHAEL C. LLOYD, a director and joint general manager of Howell & Company, Limited, tube manufacturers, etc., of Sheffield, has been appointed a director and general manager of the Weldless Steel Tube Company, Limited, and Tube Rolling Mills, Limited, Wolverhampton.

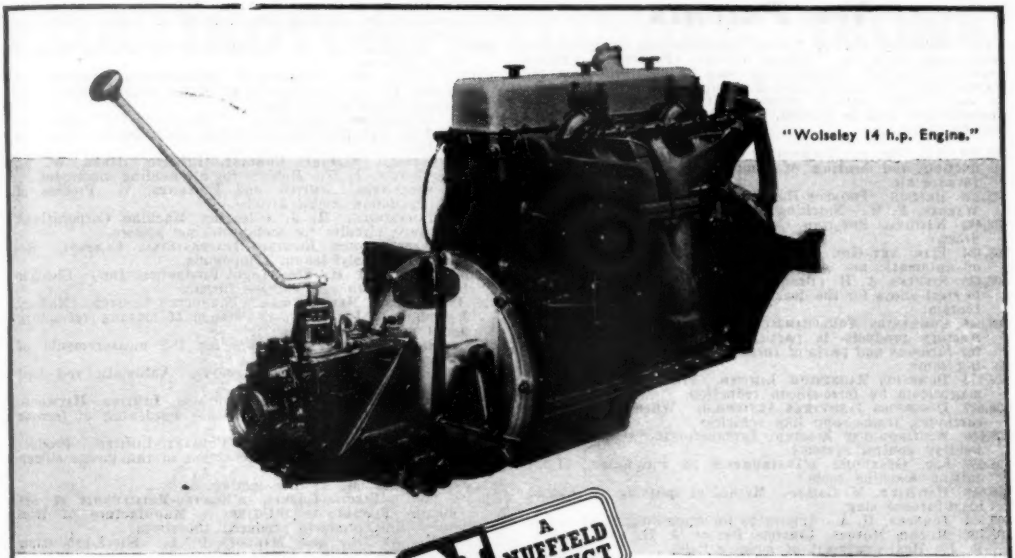
DR. J. VINEY HARDING, formerly research metallurgist with Philips Electrical, Limited, and MR. B. MILLINGTON, formerly metallurgist with De La Rue Gas Developments, Limited, have joined the service department of the International Meehanite Metal Company, Limited, which is being extended because of increased commitments.

MR. S. G. MORGAN has been appointed managing director of the Concentric Manufacturing Company, Limited, capstan workers, of Birmingham, as from January 31, on which date MR. S. H. SERSHALL'S agreement as managing director terminated. Mr. Sershall remains on the board and continues as consultant to the company.

MR. W. K. B. MARSHALL has been appointed assistant director of research of the British Welding Research Association. He was for some years works metallurgist at the Milton Works of the British Aluminium Company, Limited, and for the past eight years has been chief metallurgist and later chief development engineer to the A.P.V. Company, Limited. He is expected to take up his new duties on March 1.

Wills

MILLIGAN, F. H., chairman of J. W. Wells (Metals), Limited, Manchester	£5,735
BATE, F. H., formerly for many years of F. H. Bate & Son, ironfounders, of Stourbridge	£1,150
PARKER, E. H., late secretary of the Institution of Engineers and Shipbuilders in Scotland	£14,180
WILDE, L. M., of Doncaster, formerly business manager of Logan & Hemingway, railway contractors	£51,220
GIBSON, G. W., for many years works manager of the former Robert Thompson & Sons, Limited, shipbuilders, of Sunderland	£1,610


"Wolseley 14 h.p. Engine."

N A NUFFIELD PRODUCT

Using

STANTON-DALE

REFINED PIG IRON

USED AND RECOMMENDED
FOR ALL HIGH-DUTY
ENGINEERING CASTINGS

THE STANTON IRONWORKS COMPANY LIMITED, Nr. NOTTINGHAM

New Patents

The following list of Patent Specifications accepted has been taken from the "Official Journal (Patents)." Printed copies of the full Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, price 1s. each. The numbers given are those under which the Specifications will be printed, and all subsequent proceedings will be taken.

608,304 Akt.-Ges. für Technische Studien. Plant for the production and heating of compressed air such as blast-furnace air.

608,338 British Thomson-Houston Company, Limited, and Warren, F. W. Notching or punching presses.

608,442 National Smelting Company, Limited. Treatment of dross.

608,484 Elin Akt.-Ges. für Elektrische Industrie. Process of automatic arc welding using coated electrodes.

608,486 Stevens, A. H. (Bransome, E. D.) Alloys for addition to steel alloys for the deactivation of nitrogen and oxygen therein.

608,544 Commentry Fourchambault et Decazeville. Basic refractory products, in particular basic refractory linings for furnaces and parts of furnaces, and process for obtaining same.

608,573 Dominion Magnesium, Limited. Production of metallic magnesium by ferro-silicon reduction.

608,627 Degerfors Jarnverks Aktiebolag. Wheels for railway carriages, trams, and like vehicles.

608,636 Westinghouse Electric International Company. Arc-welding control systems.

608,639 Soc. Genevoise d'Instruments de Physique. Metal cutting machine tools.

608,658 Hatchard, M. Gallai-. Method of splitting up foamed blast-furnace slag.

608,664 Johnson, H. A. Apparatus for smoothing sheet metal.

608,707 Morris Motors, Limited, Bridle. J. H., and Brown, R. J. Heat-treatment of metal articles.

608,766 Akt.-Ges. Brown, Boveri & Cie. Turbine blades.

608,775 Imperial Chemical Industries, Limited, and Dyson, A. F. Apparatus for crimping or corrugating strip or sheet material.

608,783 Sagar & Company, Limited, J., and Sagar, J. G. Machines for milling, grinding, and drilling metal and other articles.

608,788 Dod, C. Oxygen-jet metal-cutting nozzles.

608,790 Commentry Fourchambault et Decazeville. Basic refractory products, in particular, basic refractory linings for furnaces and parts of furnaces, and a process for obtaining them.

608,900 Engineering & Research Corporation. Device for upsetting metal.

608,967 Soc. d'Electro-Chimie, d'Electro-Metallurgie et des Aciéries Electriques d'Ugine. Weld rods for depositing hard metallic layers on the surface of metallic pieces.

609,030 Akt.-Ges. Brown, Boveri & Cie. Sintered bodies for direct welding to metal parts.

609,035 Soc. Anon. Turbix. Pressure-welding process and articles produced thereby.

609,626 Aluminium Company of America. Extrusion of metal or alloy ingots.

609,644 Schori Metallising Process, Limited, and Lumb, C. E. Method of coating metal surfaces with metals.

609,652 Linde Air Products Company. Metal de-surfacing method and apparatus.

609,663 Pressed Steel Company, Limited, and Sharp, J. Welding machines.

609,664 Pressed Steel Company, Limited, and Shark, J. Portable shearing machine for shearing sheet metal.

609,676 Metropolitan-Vickers Electrical Company, Limited. Frith, W., and Anderson, T. H. Foundry machine moulding.

609,677 Tees Side Bridge & Engineering Works, Limited, and Hopson, J. H. D. Method of, and means for, making moulds for producing ferrous and non-ferrous castings provided with holes.

609,699 American Electro Metal Corporation. Process of manufacturing ferrous bodies containing silicon.

609,706 Picken, E. M. Means for use in rolling metals.

609,718 Akt.-Ges. Brown, Boveri & Cie. Arrangements for the heating of metallic workpieces by electro-magnetic induction.

609,720 Warner & Swasey Company. Indexing mechanism for locating and locking the turrets of lathes and like machine tools.

609,725 Bramberry, H. M. Composition for treating metallic wear surfaces.

609,771 Power Jets (Research & Development), Limited, and Taylor, T. A. Manufacture of bladed turbine discs, compressor rotors or the like.

609,775 Uddeholms Aktiebolag. Machines for continuous grinding and polishing of bands, rods, pipes, wire, and the like.

609,782 General Electric Company, Limited, Baker, W. F., and Brown, J. W. Holders for arc-welding electrodes.

609,907 Faulkners, Limited, and Faulkner, V. Process of making hollow metal articles.

610,030 Fitzpatrick, H. J. (Clearing Machine Corporation). Hydraulic circuits for metal-working presses.

610,033 Westinghouse Electric International Company. Reduction of molybdenum compounds.

610,161 Stevens, A. H. (Steel Ingot Production, Inc.). Checker for open-hearth regenerative furnace.

610,246 Mallory Metallurgical Products, Limited (Mallory & Company, Inc., P. R.). Method of making refractory metal composition.

610,315 Shaw, H. Instruments for the measurements of surface finish.

610,350 Linde Air Products Company. Automatic rod feed for metal removal.

610,356 Wild-Barfield Electric Furnaces, Limited, Haywood, F. W., and Laidler, D. S. Case hardening of ferrous alloys.

610,440 British Thomson-Houston Company, Limited. Production of preferred crystal orientation in thin-gauge silicon steel.

610,494 Wheeler, M. A. Die casting.

610,514 Soc. d'Electro-Chemie, d'Electro-Metallurgie et des Aciéries Electriques d'Ugine. Manufacture of iron powder, and products produced therefrom.

610,521 Morane, R., and Margot, P. L. Shock-producing machine for casting metals.

Chrome Ore Selling Prices

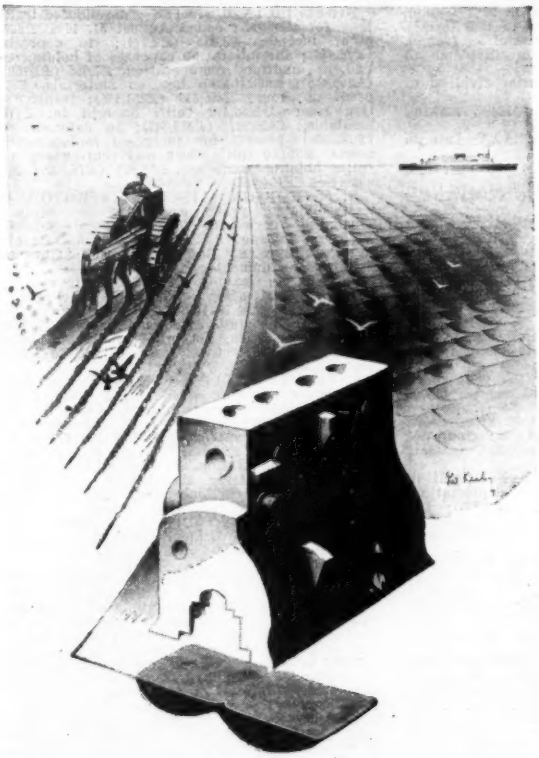
The following selling prices for chrome, which include carriage charges to nearest rail point consumers' works, apply for despatches effected as from February 1:—

Refractory Grades:—Rhodesian Imperial grade, £10 4s. 6d. per ton, ex-ship (£10 19s. 6d. per ton, ex-store); Transvaal, basis 40 per cent., scale 1s. 6d., £7 1s. 6d. (£7 15s. 9d.); Transvaal, basis 44 per cent., scale 1s. 6d., £8 6s. per ton, ex-store; Indian, basis 40 per cent., scale 1s. 6d., £9 10s. per ton, ex-store; Philippine, £7 16s. per ton, ex-ship (£8 10s. 6d. per ton, ex-store); Turkish, basis 40 per cent., scale 5s., £10 4s. 9d. (£10 19s. 9d.); Turkish, basis 43 per cent., scale 5s., £11 3s. 3d. (£11 18s. 6d.).

Metallurgical Grades:—Rhodesian lumpy, £10 9s. 9d. (£11 3s.); Baluchistan, £11 2s. 9d. (£11 16s.); Rhodesian washed concentrates, £10 4s. 6d. (£12 2s. 6d.).

Chemical Grades:—Transvaal X.L., basis 50 per cent., scale 2s. 6d. above 50 per cent., £10 10s. 9d. (£11 8s.); Transvaal "A," basis 48 per cent., scale 2s. 6d. above 48 per cent., £9 5s. 9d. (£10 2s. 9d.); Transvaal "B," basis 48 per cent., scale 2s. 6d., £8 19s. 9d. (£9 16s. 6d.); Transvaal "C," basis 46 per cent., scale 2s. 6d., £8 12s. 9d. (£9 9s. 6d.); Rhodesian Dyke Chemical, £10 11s. 6d. (£11 4s. 9d.); Rhodesian Lalapanzi, basis 48 per cent., scale 2s. 6d. above 48 per cent., £9 16s. 9d. (£10 14s.); Baluchistan, £11 2s. 9d. (£11 16s.).

WORKINGTON CYLINDER IRONS



High-duty irons of suitable compositions for cylinders, chemical use, wear resistance and other special needs are readily achieved by using Workington Hematite Irons or "UCO" Cylinder Irons in the mixture. Machine cast and free from sand and unwieldy pieces, of uniform composition throughout each cast, easily handled, quick melting, requiring much less coke and lime in the cupola than ordinary pig, they meet the requirements of modern foundry practice.

THE UNITED STEEL COMPANIES LTD

WORKINGTON IRON & STEEL COMPANY

WORKINGTON Telephone: Workington 206 Telegrams: "Mosbay," Workington CUMBERLAND

Branch of The United Steel Companies Limited

W. 76

Company News

(Figures for previous year in brackets.)

CORNERCROFT—Interim dividend of 6% (same).

TECALEMIT—Final dividend of 14%, making 20% (same).

METROPOLITAN GAS METERS—Dividend of 15% (same).

M. MOLE & SON—Dividend of 20% and bonus of 5% (same).

HUGHES-JOHNSON STAMPINGS—Interim dividend of 10% (7½%).

HEAD, WRIGHTSON & COMPANY—Interim dividend of 4% (same).

SHANKS & COMPANY—Final dividend of 12½%, making 17½% (same).

JONES'S SEWING MACHINE COMPANY—Interim dividend of 3% (same).

BROOM & WADE—Final dividend of 15%, making 22½% (same on lower capital).

WOMBWELL FOUNDRY & ENGINEERING COMPANY—Interim dividend of 6% (same).

SCOTTISH CABLES—Interim dividend of 10%. The shares were introduced in London and Glasgow last year.

HADFIELDS—Final dividend of 8%, making 13% for the nine months ended September 30, 1948 (17½% for the previous year).

ZINC INVESTMENTS—Net profit to June 30, 1948, £11,336 (£11,228); to dividends Nos. 17 and 18, 4½%, £11,250 (same); forward, £1,003 (£917).

CHESWICK & WRIGHT—Consideration of an interim dividend is deferred until after the accounts for the year ended May 31 next are available.

FOSTER, YATES & THOM—Net profit for the year ended September 30, 1948, £14,753 (£11,847); to general reserve, £8,000 (£5,000); dividend of 5% (same); forward, £2,856 (£2,703).

JOHN BOLDING & SONS—Net profit for 1948, after allowing for depreciation and taxation, £43,257 (£24,658); group net profit, £48,708; final dividend of 15%, making 20% (same); forward, £62,410 (£50,366).

ABERDARE CABLES OF SOUTH AFRICA—Net profit to June 30, 1948, after administration expenses and depreciation, £9,195 (£12,777); investment interest, £2,671 (£2,770); tax surplus, £131 (nil); to preference dividends, £5,500 (£4,822); ordinary dividend of 2½% (same); tax, nil (£4,000); forward, £722 (£475).

SPEEDWELL GEAR CASE—Trading profit for the year to August 31, 1948, £85,662 (£65,161); other income, £868 (£324); to taxation, £33,900 (£31,000); depreciation, £4,826 (£4,332); directors' emoluments, etc., £8,804 (£6,846); net profit, £38,035 (£22,236); dividend of 10% (same) and bonus of 20% (10%); property reserve, nil (£3,000); general reserve, £10,000 (£7,402); forward, £32,838 (£12,251).

OLIVER PELL CONTROL—Consolidated profit and loss account for the year to March 31, 1948, shows:—Net loss of group, £8,533, of which £7,772 is attributable to the parent company and its interests and after deducting net losses carried forward in subsidiary companies of £126; net loss of parent company, £7,646; credit balance £7,636 brought in extinguished and debit balance £10 carried forward.

THOMAS DANKS & COMPANY—Group trading profit to September 30, 1948, £16,177 (£14,345); to debenture interest, £1,125 (same); directors' fees, £650 (same); managing director's salary, £1,610 (same); debenture trustee, £10 (same); income tax, £552 (£509); depreciation, £509 (£512); net profit, £11,720 (£9,929); parent company's balance, £11,705 (£9,724); to tax reserve, £6,500 (£5,800); preference dividend, £605 (same); ordinary dividend of 7½% and bonus of 2½% (same); forward, £9,736 (£6,235).

BOULTON & PAUL—Consolidated profit for the year ended September 30, 1948 (including Midland Woodworking Company for 18 months to September 30), £214,457 (£212,611); to tax, £119,312 (£96,759); due to minority interest, £5,058 (£3,540); net profit, £90,087 (£112,312); dividend of 20% (same); dividend equalisation reserve, £27,500 (nil); replacement reserve for fixed assets, £24,000 (nil); general reserve, nil (£50,000); forward, by parent company, £43,459 (£40,572); forward by subsidiaries, £84,590 (£83,815).

J. SAMUEL WHITE & COMPANY—Consolidated trading profit for the year ended September 30, 1948, £133,475 (£293,385); to directors' fees, £2,450 (same); other remuneration, £12,731 (£12,021); depreciation, £25,340 (£22,209); deferred repairs, £5,000 (nil); audit expenses, £582 (£451); net trading profit, £87,372 (£256,254); sundry income, £3,385 (£3,037); to tax, £59,500 (£198,340); net profit, £31,257 (£60,961); brought in, £50,129 (£41,899); available, £81,386 (£102,850); to subsidiary transfers, £11,769 (£9,791); leaving parent company's balance, £69,617 (£93,059); to general reserve, nil (£25,000); preference dividend, £4,620 (same); ordinary dividend of 15% (same); forward, £41,897 (£40,339).

BIRFIELD INDUSTRIES—Consolidated trading profits, less loss, for the year ended August 31, 1948, £887,964 (£624,028); other income, £3,235 (£2,774); to depreciation, £175,057 (£78,434); administration expenses of holding company, £8,911 (£5,098); auditors' remuneration, £1,955 (£1,700); tax, £417,966 (£290,415); anticipated loss on materials, £32,000 (nil); net profit of group, £255,310 (£251,155); transfer from depreciation reserve, £35,192 (nil); brought in, £116,155 (£64,192); available, £406,657 (£315,347); to deferred repairs, £10,000 (£122,500); reserve for increased replacement cost of fixed assets, £55,000 (nil); stock and contingency reserve, £138,000 (nil); holding company, £93,889 (£76,592); forward by subsidiaries, £109,768.

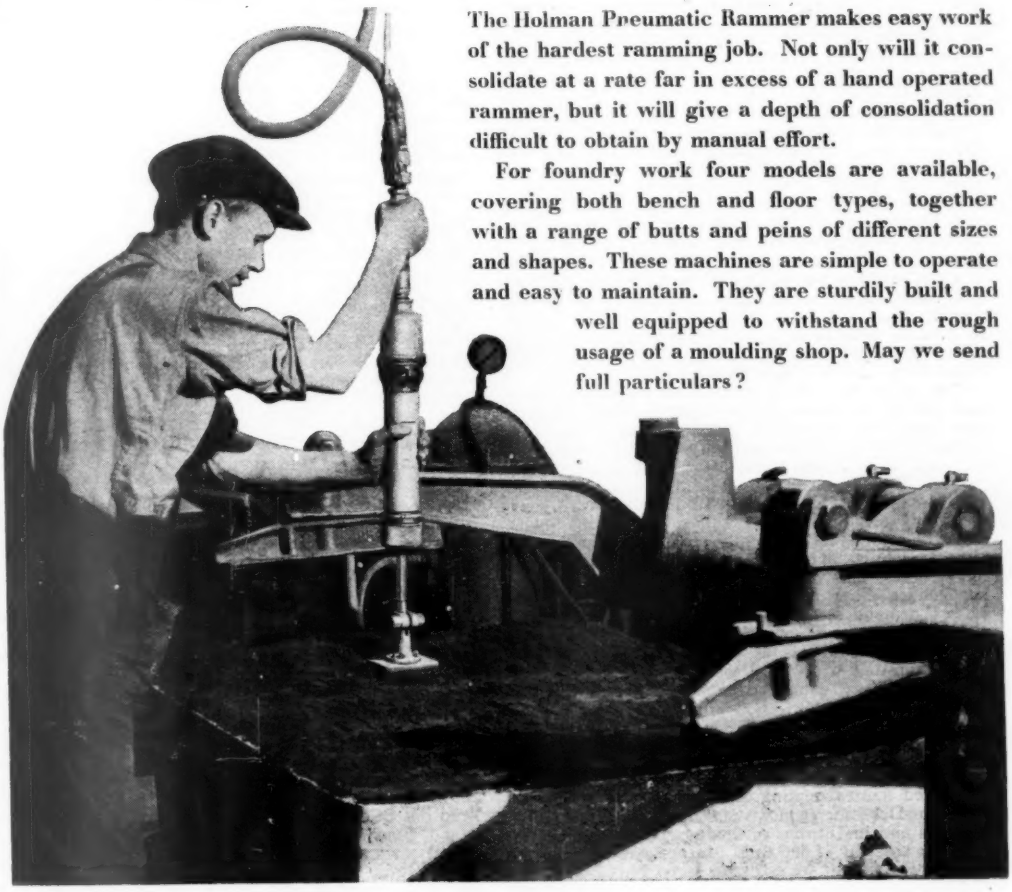
H. M. HOBSON (AIRCRAFT & MOTOR) COMPONENTS—Consolidated profit and loss to September 30, 1948 (including period of 22 months of subsidiary) shows:—Profit on trading, £160,898; surplus on sale of plant, £3,335; to depreciation, £34,716; pensions and savings schemes, £5,298; directors' emoluments, £19,696; audit fees, etc., £1,093; taxation, £64,165; leaving £39,265; profits relating to previous years, £20,731—after additional provisions for taxation, £14,879; to profit attributable to minority holders in subsidiary, £242; consolidated net profit, £59,754; retained by subsidiary, £12,166; net profit of H. M. Hobson, £47,588; to reserve, £10,000; stock reserve, £10,000; dividend of 15% (same); forward, £96,799 (£84,711).

ENFIELD CYCLE COMPANY—Consolidated trading balance for the year ended July 31, 1948, £97,975; investment income, £1,500; deposit interest, £404; tax reserve interest, £309; fees, £37; balance from Government contracts and other credits not applicable to year, £147,816; to tax, £129,000; to depreciation, £28,843; repairs and maintenance, £29,771; directors' remuneration, £9,605; auditors' remuneration, £615; tax, £18,391; outside shareholders' interests, £38; leaving £31,778; retained by subsidiary, £133; provisions no longer required, £28,927; to stock reserve, £38,000; Government securities reserve, £7,000; "A" preference dividend, £963; "B" preference dividend and bonus, £1,375; ordinary dividend of 7½% and bonus of 2½%, £12,375; forward, £29,400 (£28,541).

R. A. LISTER & COMPANY—Owing to changes in form of accounts for the year to September 30, 1948, comparative figures are not given. Consolidated profit and loss account shows:—Profits, after making provision of £50,000 for production changeover, of £598,838; other income, £6,880; to depreciation, £94,615; employees' pensions, £6,717; auditors, £3,250; taxation, £295,096; leaving £206,040, less proportion of profits of subsidiary companies attributable to outside shareholders' interest of £2,637; balance of profits attributable to interests of parent company, £203,403; taxation provisions previous years not required, £29,948; items extraneous to year's trading, £7,403; making £240,754; retained in accounts of subsidiary companies, £8,384; net profit of parent company, £232,370 (last year's net profit, after tax, £181,272, plus £18,584 tax over-provided); dividend and bonus of 18% (same); general reserve, £100,000 (nil); off cost of goodwill in purchase price of a new business nil (£2,116); forward, £248,264 (£239,094).

THE NATIONAL ARBITRATION TRIBUNAL has awarded in favour of a claim made by members of the Association of Engineering and Shipbuilding Draughtsmen, of the Clerical and Administrative Workers' Union, of the Association of Scientific Workers and of the National Association of Clerical and Supervisory Staffs, that the payment for any overtime worked on Saturday mornings by staff employees should be at the rate of time-and-one-third. The other parties to the dispute were members of Associations federated with the Engineering and Allied Employers' National Federation. The award took effect from the beginning of the first full pay period after January 24.

RAMMING IT HOME



The Holman Pneumatic Rammer makes easy work of the hardest ramming job. Not only will it consolidate at a rate far in excess of a hand operated rammer, but it will give a depth of consolidation difficult to obtain by manual effort.

For foundry work four models are available, covering both bench and floor types, together with a range of butts and peins of different sizes and shapes. These machines are simple to operate and easy to maintain. They are sturdily built and well equipped to withstand the rough usage of a moulding shop. May we send full particulars?

Holman PNEUMATIC TOOLS

THE FIRST NAME FOR LASTING SERVICE

HOLMAN BROS LTD · CAMBORNE · ENGLAND

Raw Material Markets

Iron and Steel

An increase in the output of pig-iron has become imperative in the iron and steel industry. It is largely a problem of raw materials. Blast-furnace capacity is available, or could readily be made available, if adequate supplies of coke and ironstone were forthcoming. Meanwhile, all the foundries are handicapped by short deliveries of pig-iron. The starting of a single blast furnace in Northamptonshire will help to relieve the stringency in regard to high-phosphorus iron, but low-phosphorus and hematite irons are also scarce and current outputs are quite inadequate to satisfy the needs of the foundrymen.

Acceleration of imports of steel semis from Belgium and Luxemburg has provided a welcome supplement to home production, but re-rollers are still short of material. Deficiencies are most marked in the case of sheet bars and small square and flat billets. British steelmakers are maintaining good deliveries of the heavier sizes, but the scarcity of light material tends to restrict operations at the mills engaged on thin sheets and light sections, for which there is an enormous home and overseas demand.

The continuous efforts of the steelmakers to achieve new output records are encouraged by sustained pressure from both home and overseas consumers. It is evident that the markets are not within sight of saturation, and even if conditions are becoming more competitive, British producers are in a strong position as their prices are below those of Continental rivals. All the heavy rolling mills are well supplied with ingots, while plate mills have recently been achieving remarkable production figures. Bookings, especially for the lighter sizes, are very impressive and distribution is kept under close control. Except for the heavier classes, demand for joists, sections, etc., is very strong, and rail mills have extensive commitments to home railways and collieries as well as for export. The sheet, strip and wire mills, too, are working to capacity, but simply cannot cope with all the business offered.

Non-ferrous Metals

The British Bureau of Non-ferrous Metal Statistics has issued figures relating to United Kingdom copper usage for December which show that 28,326 short tons of virgin and 13,270 tons of secondary metal were consumed, a total of 41,596 tons. In the preceding month the relative figures were 29,530 tons, 14,101 tons and 43,631 tons, so there was a fall, in all, of about 2,000 tons, divided almost equally between virgin copper and scrap. For the 12 months January to December, 1948, total consumption was 538,655 tons, comprised of 356,793 tons of virgin and 181,862 tons of secondary metal. This compares with a figure of 540,886 tons in 1947, consisting of 350,119 tons of primary copper and 190,767 tons of scrap. Stocks of copper on hand in this country at the end of last year were 120,721 tons, an increase of about 5,000 tons over the November figure. The copper situation, it must be admitted, is fairly secure so far as the U.K. is concerned, for our reserves are quite adequate to cover any inconvenience arising from late arrivals. Nevertheless, the restriction scheme which affects copper usage to the extent of 7 to 8 per cent. is still in being and is an ever-present reminder to the fabricators that the authorities are maintaining a careful watch over the supply problem.

Secondary lead is still being pressed for sale at falling prices, for, owing to the excessive quantities arising and the difficulties imposed on the consumers by licensing, there is a surplus on offer, which depresses values. Judged solely from the point of view of the secondary lead market in this country, it is certainly reasonable to deduce that no shortage of lead exists, and, indeed, even in virgin metal the inflated quotation is putting such a check on demand that it is sometimes doubted whether a rationing scheme is still necessary. At the end of December stocks of the metal in the U.K. a fall of about 3,000 tons, compared with the November 30. Consumption of lead in December was 28,146 tons, a fall of about 3,000 tons compared with the November figure. Imports of soft foreign pig-lead, which in November improved to 20,835 tons, declined to 13,817 tons in December; these low figures are a sure indication of the hand-to-mouth basis obtaining in lead to-day.

Derbyshire Stone's New Mineral Wool

After more than 12 months' research, Derbyshire Stone, Limited, Matlock, has developed a new type of mineral wool, which, it is claimed, may revolutionise Britain's heat-conservation systems and costs. Natural limestone, blended with other materials, is so treated that the rock, which has a normal crushing strength of more than 25,000 lb. per sq. in., is blown out into a fine floss.

Mr. Harold Fletcher, a director of the company, has stated that the rock wool's potential uses in heat conservation were enormous, and by laying it in a suitable form and thickness in false roofs of houses and other buildings or by using it in the cavity walls of prefabricated houses, the domestic fuel ration would not be used to the extent to which it is used at present in heating the surrounding atmosphere outside the house rather than inside. Just as it would keep in heat and keep out cold, claimed Mr. Fletcher, so also the wool would function in the reverse direction and, consequently, should be invaluable in the construction of refrigerators. It is also claimed to be non-inflammable and can be used as an insulating material in stoves and furnaces.

THE RECEIVER AND MANAGER of Douglas (Kingswood), Limited, announces that he is continuing to manufacture for Douglas (Sales & Service), Limited, the complete Douglas range of power trucks. Stillages for pre-loading are also being supplied. As formerly, these trucks will continue to be distributed in England through the sole concessionaires, George Cohen Sons & Company, Limited.